Dr. Xiaohan Zhang

*Office*:  Simpson Tower F902

*Email*: [Xiaohan.Zhang49@calstatela.edu](mailto:Xiaohan.Zhang49@calstatela.edu)

*Meetings:* Tue Thu 9:50-11:30 am SHC238

1:30- 3:10 pm SHC367

**ECON 309: Applied Business & Economic Statistics II**

**Winter 2016**

Course Description

Prerequisite: ECON 209 and MATH 102.

This course shows how statistical analysis can be used in a wide variety of practical problems. Topics include interval estimation, hypothesis testing, correlation analysis, regression analysis, and forecasting. The course requires use of hand-held calculators. It will also involve doing data analysis using Microsoft Excel.

Textbook

Please wait until the first day of class for further instructions on Textbooks.

Bowerman, Bruce L., Richard T. O’Connell, and J.B. Orris, *Essentials of Business Statistics*,

McGraw-Hill.

McClave, James T., P. George Benson, and Terry Sincich, *Statistics for Business and Economics*,

Prentice Hall.

Handouts and practice problems will be provided at our class Moodle website. If you want to have a reference book to read before the first day of class, you may get it from the library. Any books on business statistics or introductory statistics should be fine. Statistic books are generally rather similar in coverage.

Office Hours

Walk-in: Tuesdays 11:30-1:00pm and 3:15-4:45 pm

By Appointment: Thursdays 11:30-1:00 pm

Grading System

There will be two midterm examinations, a final examination. Grade points for each are as follows:

Midterm 30 points

Final Exam 55 points

Homework 12 points

Attendance Credit /Quizzes 8 points

**Midterm Exam**: Will be held in-class after finishing chapter 2, hypothesis testing.

**Final Exam**: It will be held on March 17th 10:45-1:15pm for the AM class,

1:30-4:00pm for the PM class.

**Failure to take either the midterm or the final exam without an acceptable reason will result in a course grade of “No Credit”.** The final exam will not be cumulative. Grades may be curved at the end of the quarter.

**Makeup Exams**

**There are no makeup or late test opportunities**. With a doctor’s note, one may use the other exam as their score for the missed exam as well.

Homework and Quizzes

Both the homework and the in-class quizzes are important parts of the learning process and are also parts of the course grade.Homework due dates will be specified on the homework. **Quizzes are in-class.** Some of the quizzes are group-based, while others are given to individuals.

Attendances are taken with the quizzes. **Failure to show up for quizzes will result in a zero score for the quiz.** Excused absences are only allowed when the student provides legitimate reasons and supporting official documentations (such as: family medical emergency or medical emergency with official document from hospital). Distracting behavior or activity during the class may result in a failing grade. Examples of distracting activities include, but are not limited to:

* Being consistently late to class, and/or frequently in/out of the classroom during the lecture
* Behavior that disrupts other students, such as answering calls, using electronic devices for reasons other than taking notes, or eating.
* Video/audio taping the class is not permitted without the approval from the instructor.

**Special Needs**

If the students have special needs (For example, hearing aids), please let the professor know at the end of the first lecture.

**Additional Requirements**

Please check your emails and the course website on Moodle at least twice a week. Announcements made on Moodle are treated as official announcements and may not be repeated in the classroom. The messaging function in Moodle cannot be replied with email. Therefore, if you wish to email the instructor, please use the email address Xiaohan.Zhang49@calstatela.edu.

Course Outline (Subject to Adjustments)

R. Review

A. Common Notation: Σ, , *μ*, *s*, *σ*

B. Computation of Mean, Variance, and Standard Deviation

C. Sampling Statistic: *t*-stat (or *t*-ratio), Standard Error (*SE*), and Degree of Freedom (*df*)

D. Confidence Interval: Margin of Error (*MOE*) and Level of Confidence (1 − *α*)

1. Hypothesis Testing: Single-Sample Analysis

1. Statistical Significance and the Test Error Rate (*α*)
2. Two-Sided (Two-tail) and One-sided (Upper-tail or Lower-tail) Tests
3. Test Statistic for the Mean Value: *t*-stat
4. Critical Value for a Given *α*
5. Estimated Probability Value (*p*-value) as the *α* value

2. Hypothesis Testing: Two-Sample Analysis

A. Testing for a Difference in Mean: *t*-stat

B. Testing for a Difference in Variance:  *F*-stat

3. Simple and Multiple Regression Analysis

A. Model Specification: Predicted Component (*ŷ*) vs. Unexplained Component (*e*)

B. Interpretation of Model Coefficient Estimates (*b*0, *b*1, *b*2, …, *bk*)

C. Variation Decomposition: Total Sum of Squares (TSS) and Error Sum of Squares (ESS)

D. Degree of Freedom (*df*) and Standard Error of the Model

E. Standard Error of the Coefficient Estimate (*SEb*) and its *t*-Statistic

F. Goodness-of-Fit: Multiple Correlation Coefficient (*R*) and the *R*2 value

G. Model Selection: Adjusted *R*2

4. Linear Regression Analysis with Qualitative Variables

A. Qualitative (Categorical) vs. Quantitative (Numerical) Variables

B. Use of Dummy (Indicator) Variables: The 1/0 system of dummy coding

C. Accounting for Unknown Seasonality: Use of Seasonal Dummies

D. Adjustment for Known Seasonality: Use of Seasonal Indices

5. Advanced topics