
Regression Analysis: STAT 608

Spring 2018, Sections 600 & 700, Texas A&M University, Department of Statistics

It is imperative that models be valid for any conclusions or statistical inferences to be appropriate. To that end, our course focuses on both the tools and techniques for producing valid models. We study the underlying mathematical properties of linear and non-linear models to make better decisions about which plots should be used and how they should be interpreted.

Instructor & TA

Instructor: Dr. Elizabeth Young Kolodziej
Office: Blocker 415G
Email: eyoung24@tamu.edu
Website: <http://www.stat.tamu.edu/~eykolo>

TA: Reza Armandpour
Office: Blocker 422
Email: armand@stat.tamu.edu
Office Hours: 10am-noon

- Infer appropriate conclusions about populations based on data
- Explain and compare properties of summary and inferential statistics and models
- Combine concepts in new ways to solve different problem

Topics

1. Introduction to Design Matrices
2. Simple Linear Regression
3. Diagnostics and Transformations for Simple Linear Regression
4. Weighted Least Squares
5. Multiple Linear Regression
6. Diagnostics and Transformations for Multiple Linear Regression
7. Variable Selection
8. Logistic Regression
9. Serially Correlated Errors

Course Content

Learning Objectives

By the end of the semester, the student should be able to:

- Identify appropriate graphs, summary statistics, models, and inferential statistics for various contexts
- Interpret graphs, statistics, and models in various contexts
- Calculate summary and inferential statistics
- Compare and contrast various models
- Create appropriate models for various contexts

Meeting Times

Class: TR 9:35-10:50am Blocker 457
Office Hours: TR 2:15-3:15pm Blocker 415G
Online Discussions: Wednesdays 5-6pm eCampus

Prerequisites

Three semesters of calculus, linear algebra, some experience with programming, and a course in inferential statistics (AP statistics, 212, 641, or 651) are prerequisites for this course. Statistics classes in mathematical statistics that require calculus as a prerequisite like 630, 610, or 414 are not appropriate prerequisites. Using eCampus Collaborate often requires the latest version of the internet browser

Chrome. You should know how to update software on your computer.

Requirements

Materials

- Required text: Sheather, Simon J. (2009). *A Modern Approach to Regression with R*. Springer Texts in Statistics. ISBN: 978-0-387-090607-0, e-ISBN: 978-0-387-09608-7
- Software: SAS, R, STATA, or Python. You are welcome to use whatever statistical package works best for the problem at hand. I would encourage you to use either SAS or R, whichever corresponds best with your career path. R installs on Windows, Linux, and Mac computers. SAS now has a cloud version accessible from all computers, but it was originally written for Windows. R, SAS, and STATA code for the examples in the textbook is also provided at the website below; I just won't be able to help you with STATA or Python when things go wrong.
- A scientific (non-programmable) calculator, such as a TI-36X, TI-30X, or Casio fx-260 for exams.

Important Websites

A discussion board, grades, and notes will be posted here:

ecampus.tamu.edu

SAS, STATA, and R code for the textbook examples can be found here:

www.stat.tamu.edu/~sheather/book/

Homework will be posted on WebAssign:

www.webassign.com

See eCampus for WebAssign login information.

Grading Details

Grading Scale

There are not any extra credit projects offered to compensate for a poor average. Everyone must be

given the same opportunity to do well in this class. The final grade is based on a scale no stricter than 90-100: A, 80-89: B, 70-79: C 60-69: D, below 60: F.

Grading

Homework 15%

Exams 25% each - 2 exams

Final Exam 35%

I can weight the final exam slightly more heavily *if it helps you*.

Incompletes:

A temporary grade of I (Incomplete) at the end of the semester indicates that the student has completed the course with the exception of a major quiz, final exam, OR minimal other work. The instructor is only allowed to give this grade when the deficiency is due to an authorized absence or other cause beyond the control of the student.

Exams:

We will have two exams and a final. Exam 1 is scheduled for Tuesday, February 27. Exam 2 is scheduled for Tuesday, April 3. The Final Exam is scheduled for Thursday, May 3, 12:30-2:30pm. Online students will usually take the midterm exams during the 24-hour window beginning one hour after the in-class exam begins, lasting for 24 hours. Online students will take the final exam during the 24 hour window that is Thursday, May 3.

Homework:

Homework is required so that you get a better understanding of the material covered, plus it will help you to keep up. Each homework is worth the same percentage of your grade, regardless of the number of "points" it is worth. Please use a cover sheet with your name, your email address, the homework number, and the due date. It is strongly encouraged that you work with another student; you will get a better understanding of the material if you discuss it with someone. You must submit your own work, however (see the section on

Scholastic Dishonesty below). Please include the name of any students you have collaborated with on your cover sheet of your homework.

No late homework will be accepted, nor will you be allowed to make up missed homework. Solutions are posted immediately on the due date. To compensate for university excused absences, the lowest homework assignment score will be dropped. If you have extenuating circumstances that require a different plan, please contact me.

University Policies:

Academic regulations and procedures are governed by University policy. Academic dishonesty cases will be handled in accordance the University's policies.

Aggie Honor System:

An Aggie does not lie, cheat, steal, or tolerate those who do. Academic dishonesty includes the commission of any of the following acts: cheating, fabrication / falsification, multiple submissions, plagiarism, complicity, and other types of misconduct. Please see <http://aggiehonor.tamu.edu> for the complete Honor Council Rules and Procedures.

- Cheating is intentionally using or attempting to use unauthorized materials, information, notes, study aids or other devices or materials in any academic exercise.
- Plagiarism consists of passing off as one's own ideas, words, writing, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have the permission of that person.
- Complicity is intentionally or knowingly helping, or attempting to help, another to commit an act of academic dishonesty. Examples include knowingly allowing another to copy from ones paper during an examination or test; distributing test questions or substantive information about the test without the instructors permission; collaborating on academic work knowing

that the collaboration will not be reported; taking an examination or test for another student; and conspiring or agreeing with one or more persons to commit, or attempt to commit, any act of scholastic dishonesty.

For more information about University policies and regulations, please see the following:

- Academic Integrity and Student Rules:
<http://student-rules.tamu.edu>
- Aggie Code of Conduct:
<http://compliance.tamu.edu/CodeConduct.aspx>
- Aggie Core Values:
<http://www.tamu.edu/about/coreValues.html>

Statement on Disabilities:

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, currently located in the Disability Services building at the Student Services at White Creek complex on west campus or call 979-845-1637. For additional information visit <http://disability.tamu.edu>.

If you have a disability requiring an accommodation, please contact me as soon as possible so that we can make appropriate arrangements.

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