Online STAT 705 – Regression and Analysis of Variance -- Syllabus for Spring 2020

Instructor Information

I am Dr. Karen Keating, your instructor for this course. My office is in Dickens 108D on the Manhattan campus, but the best way to contact me is via email. I prefer that you use Canvas email for all correspondence. In the rare event that Canvas email is not available, you can also reach me at my K-State address keatingk@ksu.edu.

Prerequisites

The prerequisite for this course is one previous statistics course. You should already understand how to perform a hypothesis test (using both the critical value approach and the p-value approach), and you should also understand confidence intervals. If these concepts are vague to you, I strongly suggest that you obtain an undergraduate textbook for introductory statistics and keep it as a reference.

Structure of the Course

In the first half of the semester, we will be covering topics in regression analysis. In the second half of the semester, we will be covering topics in Analysis of Variance (ANOVA). This course consists of 6 modules, and each module contains between 3 and 8 lessons. Each lesson corresponds to one section in the textbook. Most lessons include short "Check Your Knowledge" questions, which you can use to assess your understanding of the lesson. These questions are available only online, and are not graded. There are four graded homework assignments in which you will analyze a provided data set and answer questions about the analysis. The answers to these assignments are submitted online. There are also two graded exams, which are also submitted online.

Timeline

The due dates for the exams and homework assignments are given in Canvas. These dates are based on a regular semester. While I encourage you to work at your own pace, the course needs to be finished by the end the semester, so that I can turn in the grades on time. You are welcome to work through the material faster than what is indicated in the schedule shown below. To stay on schedule, you should plan to complete three lessons per week. This is equivalent to a three-hour on-campus course that meets three times a week.

Textbook

Your instructor has written a textbook specifically for this course. It is free and a PDF can be downloaded from Canvas. No other textbooks are required, but if you want additional reading I recommend these two.

- A Second Course in Statistics -Regression Analysis, 7th Edition, Mendenhall and Sincich. ISBN-13: 978-0-321-69169-9
- Design of Experiments: Statistical Principles of Research Design and Analysis, 2nd Edition Robert O. Kuehl. ISBN-10: 0-534-36834-4

Exams and Homework

Your final course grade will be based on two exams (a midterm and a final), each worth 100 points, and four homework problems worth 25 points each. All of these will be submitted online. For each of the four homework assignments, I will provide a dataset and a list of questions to answer. You will work offline to answer the questions. When you are finished, you will enter your answers into Canvas. No proctor is required for the homework assignments. The two exams are also online, but you will be required to engage a proctor for each exam. There is more information on proctoring later in the Syllabus.

For all assignments, you are bound by the K-State Honor Pledge: "On my honor, as a student, I have neither given nor received unauthorized aid on this academic work."

Make-up Policy

Each exam and homework assignment has a due date and time. These must be submitted online by the deadline. You are welcome to submit these early, but late submissions cannot be accepted. (This is a limitation in Canvas. I cannot provide feedback to any student until all students have submitted the assignment.) All assignments will be graded within 48 hours after its deadline. At that point, you can view your scores, the complete solution, and my comments in the Canvas SpeedGrader.

The day and time for each deadline corresponds to the local time in Manhattan, KS. This is either CDT or CST, depending on the time of the year. To convert Manhattan time to your time zone, you can use the online time zone converter: https://www.timeanddate.com/worldclock/converter.html.

These deadlines have two purposes:

1. They help you stay on track so you can complete the entire course by the end the semester.
2. They allow the instructor to provide feedback to students and release the grades in a timely manner.

I strongly recommend that you try to submit these assignments a day or two ahead of the deadline, to avoid the stress of dealing with potential technical issues or other emergencies. If there is a dire and unavoidable circumstance that prevents you from completing an assignment on time, please contact the instructor as soon as possible. Otherwise, missing or late assignments will receive a grade of 0.

Grading Scale

There are a total of 300 points possible for the semester. Letter grades are assigned as follows:

A is 255 to 300 points
B is 225 to 254 points
C is 180 to 224 points
D is 150 to 179 points
F is 149 or less

Note that a curve has already been built into the grading scale. There will be no opportunities for individual extra credit, and there will be no additional curving of grades at the end of the semester.

Software

We will be using SAS (short for Statistical Analysis System) in this course. Prior knowledge of SAS is not a requirement for this course. I will provide complete SAS code for all the examples that are in the lectures, and you can modify the code to suit individual needs. There are many different ways to access SAS, and each one is slightly different. I highly recommend that you use SAS Studio, even if you already have access to a recent version of SAS. Older versions of SAS may not properly execute the code that I provide. SAS Studio operates through a web browser, and can be accessed from both MACs and PCs . You will need to create an account with SAS, but this is a free service and you can continue to use it after our course is complete. During the first week of the semester, I will provide directions for obtaining a free version of SAS and instructions for basic SAS programming. If you want to get started now, here are some links from the SAS website.

- General directions for accessing SAS Studio: http://support.sas.com/ondemand/manuals/SASStudio.pdf
- After you are successfully enrolled, you can access SAS Studio at any time from any browser at this URL: https://odamid.oda.sas.com/SASLogon/login
- General information about using SAS Studio: http://support.sas.com/documentation/cdl/en/webeditorug/66932/HTML/default/viewer.htm#p092daf4a5ypjcn138maiooc8wsn.htm

Technology Requirements

K-State has technology recommendations (http://www.k-state.edu/its/buying/) for success in online learning. You can also visit the K-State Global Campus website to make sure your technology (http://global.k-state.edu/students/services/technology) is up to date. Canvas will work best in the Google Chrome browser, and JavaScript must be enabled. If you choose to use another browser, please make sure your course materials function within that system. You may need to confirm that your browser, java, flash, and pdf reader are all updated to the latest version.

Technical Difficulties

The K-State IT Help Desk is available to assist you with questions regarding the technology used for your course.

Phone: 785-532-7722 or toll free 1-800-865-6143
Email: helpdesk@k-state.edu

If you have issues with your technology, please contact them first, they are the technology experts. If you continue to have problems, please email the instructor. If you miss a deadline due to technological difficulties, make sure it is documented through communication with the IT Help Desk, then exceptions may be made on a case-by-case basis.

Proctoring Information

This course will use proctored online exams. You will need a proctor.

- You **MUST** have your proctor identified and all proper forms turned in to Global Campus by the end of the second week of class. Remember the first exam will come up much more quickly than you expect.
- Global Campus coordinates all communication with your proctor. Please contact Global Campus for all proctor issues.
- The Instructor is not responsible for proctor communication, acceptance or administration.
- The following website will be of assistance: http://global.k-state.edu/students/services/testing

Steps for getting a proctor:

1. Determine who will be your proctor. The Global Campus website noted above has a list of suggested locations to try. They can also assist with finding proctors in your area if you email globaltesting@ksu.edu.
2. Ask the proctor you have selected to complete and submit to Global Campus a proctor form. This form is located at http://global.k-state.edu/students/services/proctor. It can be submitted electronically.
3. After your proctor has been approved by Global Campus, you and your proctor will receive a confirmation of proctor acceptance.
4. After you receive confirmation from Global Campus, only then may you set up exam times on the exam dates with your proctor. If you have not received this notification in what would be considered a timely basis, you should certainly follow up to make sure all is OK.

Proctor issues you must consider:

- Make sure your proctor will be available for **all** of the exam dates now. Some colleges will not proctor exams during their final exam week. There will not be any deadline exceptions made for proctors that are unavailable for a particular exam. It is your responsibility to make sure your proctor is available for all of the exam dates in advance.
- **Consider utilizing Examity for your online exams. You will have location flexibility, and Examity is open 24 hours a day. Please review the information in your course under the Proctoring module.**
- Please understand that if you choose to take the exam on the last day and run into technical difficulties, or computer difficulties, you risk not being able to take the exam. Your proctor may not be able to reschedule. I do not recommend scheduling the exam on the last day. Rather it should be used as backup.
- Should you need to be gone from work to take an exam, make sure your employer has granted you permission in advance to be gone from work for all of the exam dates in advance.
- Proctors may expect payment for this service.
- Make sure you arrange testing times in advance with your proctor as only your proctor can access the exam. Many require a **one week notice**. No exceptions will be made for late notification of a proctor.

Additional proctoring information is available on Canvas. Click on Modules, then Proctoring.

Student Access Center and Classroom Accommodations

Students with disabilities who need classroom accommodations, access to technology, or information about emergency building/campus evacuation processes should contact the Student Access Center and/or their instructor. Services are available to students with a wide range of disabilities including, but not limited to, physical disabilities, medical conditions, learning disabilities, attention deficit disorder, depression, and anxiety. For assistance, contact the Student Access Center at accesscenter@k-state.edu, 785-532-6441 (or video phone 785-370-0431). For more information, visit their website http://www.k-state.edu/accesscenter/

Academic Honesty

"On my honor, as a student, I have neither given nor received unauthorized aid on this academic work." Kansas State University has an Honor and Integrity System based on personal integrity, which is presumed to be sufficient assurance that, in academic matters, one's work is performed honestly and without unauthorized assistance. Undergraduate and graduate students, by registration, acknowledge the jurisdiction of the Honor and Integrity System. The policies and procedures of the Honor and Integrity System apply to all full and part-time students enrolled in undergraduate and graduate courses on-campus, off-campus, and via distance learning. The Honor and Integrity System website can be reached via the following URL: www.k-state.edu/honor. A component vital to the Honor and Integrity System is the inclusion of the Honor Pledge which applies to all assignments, examinations, or other course work undertaken by students. The Honor Pledge is implied, whether or not it is explicitly stated. A grade of XF can result from a breach of academic honesty. The F indicates failure in the course; the X indicates the reason is an Honor Pledge violation.

University Expectations of "Classroom" Conduct

All student activities in the University, including this course, are governed by the Student Judicial Conduct Code as outlined in the Student Governing Association By Laws, Article V, Section 3, number 2. Students who engage in behavior that disrupts the learning environment may be asked to leave the class (in an online environment, you may be restricted from accessing the course).

Copyright

Copyright is a form of legal protection that allows authors, photographers, composers, and other creators to control some reproduction and distribution of their work. Both students and professors are protected by copyright. All of the material in this course belongs to K-State and the professor who created it. You are free to use all of the information in this course for your personal use. You are also free to download the files and save them for your future use. You do not have permission to give these files to others outside of this course, and you do not have permission to make any of this information public (for example, by posting it on a public website). Please visit http://www.k-state.edu/copyright/basics/ for more information.

Topic List

Getting Started: Introduction to SAS

I. Simple Linear Regression

- Part 1. Introduction
- Part 2. Assumptions
- Part 3. Inference
- Part 4. Software and Diagnostic Plots
- Part 5. NASA Rocket Propellant Example
- Part 6. ANOVA Table, F and t tests
- Part 7. Goodness of Fit
- Part 8. Correlation Analysis

II. Multiple Regression

- Part 1. Introduction
- Part 2. Body Fat Example
- Part 3. More Than Two Predictors
- Part 4. General Linear Regression Model
- Part 5. Qualitative Predictors (ANCOVA)
- Part 6. Influence and Outliers

III. Model Building

- Part 1. Criteria for Model Selection
- Part 2. Procedures for Model Selection
- Part 3. Prediction Models

Midterm Exam (must be taken between March 12 and March 23)

IV. Analysis of Variance

- Part 1. Principles of Experimental Design
- Part 2. Single Factor Studies
- Part 3. Linear Models
- Part 4. Model Diagnostics
- Part 5. Multiple Comparisons
- Part 6. Contrasts, Linear and Quadratic Trends
- Part 7. Power and Sample Size

V. Two-Way ANOVA

- Part 1. Definitions and Models
- Part 2. Hypotheses
- Part 3. ANOVA Table and F tests
- Part 4. T-tests and Contrasts
- Part 5. SAS Statements
- Part 6. Examples

VI. Generalizations

- Part 1. Three-way ANOVA
- Part 2. Randomization and Blocking
- Part 3. A Random Effects Model
- Part 4. A Mixed Effects Model

Final Exam (must be taken between May 7 and May 14)