**STA209-04: Applied Statistics** Spring 2019

**Scheduling**: 2:30 – 3:50 MWF, 2402 Noyce Science Center

**Instructor**: Javier E. Flores
**Office**: 2042 Noyce Science Center
**Email**: floresja@grinnell.edu
**Office Hours**: MWF 12:30 – 1:30, or by appointment.

**Textbook**:

*Statistics: Unlocking the Power of Data* (Second Edition) by R.H. Lock, P.F. Lock, K. Lock Morgan, E.F. Lock, and D.F. Lock.

**Course Description**:

This course covers foundational statistical methods such as data visualization, statistical inference for one and two samples, ANOVA and regression, and categorical data analysis. Statistical software is used to perform data analyses and to solidify understanding of select topics through hands-on simulation.

**Learning Outcomes**:

**Aims**:

- Introduce statistics, its vocabulary, and fundamental principles.
- Develop in students the ability to intelligently read, recognize, interpret, and discuss statistical concepts.
- Build confidence in the application of foundational statistical methodology as well as instill an understanding of how data may be leveraged to make informed decisions.

**Objectives**:

After completing this course, a student should be able to:

- Utilize statistical software (Minitab) for data visualization and exploration, and to apply appropriate inferential methods.
- Succinctly and accurately communicate (in writing and speaking) all aspects of a statistical analysis, including the rationale for the analysis itself and any resulting findings.
- Read, identify, and critique the statistical concepts and choices of data presentation used in various media publications (newspaper articles, reports, blogs, etc.)

**Software**:

Minitab will be the primary software used for both in-class labs and any assigned work. This software is available on computers throughout the campus as well as our classroom computers. In addition to Minitab, there is a wide array of software available to the aspiring statistician. Some examples include R, SAS, Python, SPSS, and Stata. While this course will base its material on the use of Minitab, I strongly encourage students to explore the use of other available statistical software (R specifically) in data analysis and visualization.

**Assessment**:

Homework 15%

Homework will be assigned once per week. No late homework will be accepted (unless my permission is obtained in advance of the due date), but your lowest two (2) scores will be dropped. Homework is due at the beginning of class on the specified due date. Please turn in a **neat** and **clean** paper copy of your assignment, including any printed graphs (if they are asked for). I encourage you to work with other students or visit the Math Lab for help on homework questions, but you should clearly understand all your answers and your assignment should be entirely in your own words. If you engage in significant collaboration with classmates or tutors, you must explicitly acknowledge those persons on the top of your assignment (again, you are encouraged to collaborate, I want to emphasize that there is no penalty for doing so).

Exams (3) 15%, 15%, 20%

Exams will be closed notes and only basic calculators will be allowed (ie: no cellphone calculators). You are expected to take the exam on the scheduled date and time, if you have a conflict with an exam date make sure to notify me immediately. Alternative exam arrangements need to be made at least one week in advance of the time you plan to take the exam; this includes taking the exam in a different location, or times going beyond the given class time. Alternative arrangements are not guaranteed unless proper notification is given.

Labs and Participation 15%

Active participation in class is expected. In addition to your lab write-ups being scored, your engagement will be assessed through the effort you exhibit during labs, your attendance record, and a qualitative judgement of your participation during class. As an instructor, I will keep notes throughout the semester regarding your participation level. Repeated unexcused absences, not engaging in class activities, using your cell phone during class, or other off-topic behavior will negatively impact your engagement score.

Final Project 20%

There will be an ongoing group project throughout the semester. The project will include a few short progress reports before culminating in a short in-class presentation and a three (3) page written report in the last week of the semester. More details on the final project will be provided later in a separate document.

**Attendance**:

Regular attendance is expected, and students are responsible for being aware of all announcements made during class time. Permission must be obtained **in advance** for any absence. I understand that unexpected events can lead to absences during the semester, but I ask to be notified as soon as possible if you will be missing class.

**Course Feedback**:

As essential as it is for me to assess your understanding of material, it is equally essential for you, as a student, to evaluate and critique my explanations. I greatly value student feedback, and I strongly encourage students to voice their evaluations throughout the semester.

**Academic Honesty**:

At Grinnell College you join a conversation among scholars, professors, and students, one that helps sustain both the intellectual community here and the larger world of thinkers, researchers, and writers. The tests you take, the research you do, the writing you submit—all these are ways you participate in this conversation.

The College presumes that your work for any course is your own contribution to that scholarly conversation, and it expects you to take responsibility for that contribution. That is, you should strive to present ideas and data fairly and accurately, indicate what is your own work, and acknowledge what you have derived from others. This care permits other members of the community to trace the evolution of ideas and check claims for accuracy.

Failure to live up to this expectation constitutes academic dishonesty. Academic dishonesty is misrepresenting someone else's intellectual effort as your own. Within the context of a course, it also can include misrepresenting your own work as produced for that class when in fact it was produced for some other purpose. A list of dishonest behaviors can be found at the following link:
https://catalog.grinnell.edu/content.php?catoid=12&navoid=2537#alleged-violation

**Inclusive Classroom**:

Grinnell College makes reasonable accommodations for students with documented disabilities. Students need to provide documentation to the Coordinator for Disability Resources, information can be found at http://www.grinnell.edu/about/offices-

services/accessibility-disability/disability-services. Students should then speak with me as early as possible in the semester so that we can discuss ways to ensure your full participation in the course and coordinate your accommodations.

**Religious Holidays**:

We encourage students who plan to observe holy days that coincide with class meetings or assignment due dates to consult with us in the first three weeks of classes so that we may reach a mutual understanding of how you can meet the terms of your religious observance, and the requirements of this course.

**Getting Help**:

The Math Lab (Mathematics Learning Center – 2012 Noyce Science Center) has tutors in statistics that are available 7 days a week. See the website for additional information and hours: http://www.grinnell.edu/academics/areas/math-stats/math-lab

**Tentative Schedule**:

| Week | | Chapter(s) | Exam |
|---|---|---|---|
| **1** | **(1/23 – 1/25)** | 1 | |
| **2** | **(1/28 – 2/01)** | 1, 2 | |
| **3** | **(2/04 – 2/08)** | 2, 3 | |
| **4** | **(2/11 – 2/15)** | 3 | |
| **5** | **(2/18 – 2/22)** | 4 | Exam 1 (Chapters 1 – 3) |
| **6** | **(2/25 – 3/01)** | 5 | |
| **7** | **(3/04 – 3/08)** | 6 | |
| **8** | **(3/11 – 3/15)** | 6 | Exam 2 (Chapters 4 – 6) |
| **9** | **(3/18 – 3/22)** | - | Spring break! |
| **10** | **(3/25 – 3/29)** | - | Spring break! |
| **11** | **(4/01 – 4/05)** | 7 | |
| **12** | **(4/08 – 4/12)** | 8 | |
| **13** | **(4/15 – 4/19)** | 8, 9 | |
| **14** | **(4/22 – 4/26)** | 9 | |
| **15** | **(4/29 – 5/03)** | 10 | |
| **16** | **(5/06 – 5/10)** | - | Final Project Presentations |
| **Finals** | **(5/13 – 5/17)** | - | Exam 3 (Comprehensive) |