Statistics 411/511
Methods of Data Analysis I

Fall 2016

[redacted]

Lecture: MF 1:10 - 2:00pm Roberts Hall 312A

Lab: W 1:10 - 2:00 pm and 2:10 - 3:00pm Reid 305

Course web page: Brightspace (Desire2Learn)

Prerequisites: STAT 217 or STAT 332 or STAT 401 (or equivalent with permission)

Required Text

Ramsey, F.L. and Schafer, D.W. (2013). The Statistical Sleuth: A Course in Methods of Data Analysis (3rd Ed). Boston, MA: Brooks/Cole.

Computing

The statistical software that will be used in this course is `R`, which is a free software environment that can be run on most Unix platforms, Windows, and MacOS. `R` can be downloaded at: `http://www.r-project.org`. You also have the option of using `Rstudio` which makes `R` more visually pleasing and user-friendly and can be downloaded at: `http://rstudio.org`. The fundamentals of using `R` will be demonstrated throughout the course and all code used for in-class examples will also be available. Helpful `R` resources include:

Free `R` minicourses: `http://tryr.codeschool.com`

Two minute videos on many `R` functions: `http://www.twotorials.com/`

Venables, W.N., Smith, D.M. and R Core Development Team (2002). *An Introduction to R*. Available online at: `http://www.cran.r-project.org/doc/manuals/R-intro.pdf`.

Course Information and Policies

Learning Outcomes: The goals of this course include introducing you to a wide variety of common methods of statistical analysis for both experiments and observational studies, understanding the statistical reasoning behind them, translating results into appropriate statements, and carefully considering the scope of inference of the results. A broader goal is to help you build a philosophy of using statistical inference with an emphasis on careful written justification of assumptions and your decisions, and clear and concise communication of statistical results to others. It is also meant to build your ability to critically evaluate the inferential statements made in research publications and acquire the skills to learn and do statistics on your own in the future.

Website: Class notes, homework assignments, handouts, and other announcements will be posted on the course Brightspace (D2L) website. **I expect you to check it daily**. If you do not have daily access to the internet please let me know. Set up D2L so that you get email notifications when postings are made. **Do NOT send emails to the instructor via D2L as they will not be answered–to email the instructor use the email address provided!**

Readings: You are expected to read the text, preferably before we cover material in class. **In-class material is meant to be in conjunction with the text NOT a substitute for the text**. I will focus class time on helping you work through the hardest concepts and adding additional material rather than simply reiterating everything in the text. This course is very much taught at a graduate level in terms of student responsibility for learning.

Class notes: Class notes will be posted on D2L prior to class. It is your responsibility to print the notes prior to class if you choose. I expect you to be responsible for everything in the notes unless I tell you otherwise. Lecture will be used to go over parts of the chapter that have proved difficult for students in the past.

Labs: Lab will be held on every Wednesday to provide you an opportunity to become more familiar with `R`. While lab time will primarily focus on the fundamentals of `R` and actually doing statistics, this time may also be used for going through additional examples, clarifying concepts presented in class, and presenting additional material. **Lab attendance and participation is mandatory–if a conflict comes up with lab it is your responsibility to notify me as soon as possible. Labs CANNOT be made up before or after the allotted lab time!**

Homeworks: I will assign roughly one homework assignment each week. I encourage you to talk through problems with fellow students, but **your write-up must be your own work and must be written in your words**. If you have any questions about the limits of collaboration, you are expected to ask for clarification. Numerical problems may be turned in in your handwriting. Data analysis problems must be typed and submitted in the format described in the *Writing a Stat Report* document. For full credit, you must follow all directions. **Late homeworks will not be accepted–it is your responsibility to make sure your homework is turned in on time**.

Projects (STAT 511): A project is required for STAT 511 and will be worked on throughout the semester. The project will involve choosing a specific research problem and applying the concepts covered in class. The emphasis is on study design and scope of inference rather than methods of analysis. Start thinking about problems and/or research ideas that interest you! The project is not required for STAT 411 students, though STAT 411 students may choose to do the project and then will be graded under the STAT 511 scheme. This must be decided before the midterm and a plan must be discussed in detail with me. Additional work may also be required of the STAT 511 students on homeworks and exams throughout the semester.

Grading:

	STAT 511 (%)	STAT 411 (%)
Homework	40	45
Lab	5	5
Project	15	-
Midterm	20	25
Final Exam	20	25

Expectations: It is expected that you will be open-minded and willing to learn and succeed in this class. Consequently, it is your responsibility to make a *sincere* effort in approaching and learning the course material. Your effort is vital to your success in this course. In turn, you can expect me to be open-minded and willing to help you succeed in this course.

General Classroom Etiquette:

- We will start lecture at 1:10pm sharp and end at 2:00am $\pm$ 1 minute and will start lab at 2:10pm sharp and end at 3:00pm $\pm$ 1 minute.
- If you need to come in late or leave early, do so **quietly**.
- We will treat **everyone** with **respect**.
- **Participate**!
- **Ask** questions!
- **No use of cell phones–cell phone use may result in the lowering of your grade!**
- Laptops may only be used for the purpose of note taking and running `R`.

Academic Dishonesty: This class will follow the Montana State University policy on academic dishonesty found in the Section 420 of the Student Conduct Code. At minimum a score of zero will be given for the entire homework, lab, exam, or project in which academic dishonesty occurred and the submission of a report to the university in order to track violations across classes (see Section 430 of the Student Code).

Disability Accommodation: If you have a documented disability for which you are or may be requesting an accommodation(s), you are encouraged to contact me and Disabled Student Services as soon as possible. All requests for possible accommodations **must** be made within the first two weeks of the course.