Credits and Prerequisites

This course is 4 credits. It combines approximately 120 hours of reading, online activities, computer activities, and assignments. The enforced prerequisite for this course is ST517 Data Analytics I.

Course Goals

• To add methods for binary, binomial, and count data to your data analysis tool-kit. Specific topics include: methods for tables of counts, logistic regression, log-linear regression, fixed and random effects, data imputation methods, estimation and prediction, cross-validation.

• To gain further experience using R to perform exploratory and inferential data analysis and to use simulations for understanding the properties of estimators.

Learning Outcomes

• Differentiate between methods for sampling binary and multivariate count data and apply appropriate descriptive and inferential statistical tools to address questions of interest.

• Recognize situations in which to use different data analysis tools, and be able to appropriately implement those tools in R.

• Recognize situations in which adding random effects to a statistical model is an appropriate approach, and be able to implement mixed effects models in R.
• Perform a complete data analysis—describing a dataset and research questions; selecting between candidate models; evaluating model assumptions and taking appropriate remedial action; interpreting and reporting results.

University and Department Policies

Please note: Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at http://ds.oregonstate.edu. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.

Please note: The Statistics Department follows the University rules on civility and honesty. These can be found at http://oregonstate.edu/studentconduct/offenses-0. You are responsible for knowing what these rules entail and what violations of these rules look like. Ignorance of these rules is not an excuse for violating any of them.

Please note: To receive 4 credits for this course, a student must dedicate a total of 12 hours per week to learning the material, participating in discussions, completing assignments, working on computer lab activities, exams and projects.

Learning Resources

The course is composed of 10 week-long modules. The learning materials for a module consist of:

• Readings will be assigned from the following textbooks—these four books are either freely available online or can be accessed for free through the OSU library. Additional readings may be assigned and will be provided as needed.


- Narrated Adobe Presenter lectures (slides with a voiceover) that cover the topics for the week and important concepts from the readings.
- Computer lab Self-paced exercises in R intended to teach you how to perform computer simulations to understand the properties of procedures as well as perform data exploration and statistical analyses.

Within each module, the following learning assessments are due (exact due dates are found in the Syllabus section of the canvas course site):

- two discussion board posts,
- two quizzes,
- submission of your lab work, and
- a homework assignment

The final two modules of the course are a little different. There is no homework, lab, discussion or quiz. Instead you will be beginning and completing your final project.

**Recommended Approach**

Within a module, the learning resources aren’t in any particular order. The readings and lectures come first, but that doesn’t mean you need to complete them all before moving on to the other pages. You will however always want to complete the computer lab before attempting the first question on the homework, and generally after the readings and lectures. You will probably find iterating between lectures, reading and glancing over relevant homework problems the best way to work through the material.

**Course Policies**

**Canvas.** This course will be delivered via Canvas where you will interact with your classmates and your teaching assistant and the instructor. Within the course Canvas site you will access the syllabus, learning materials and tutorials. You will also be able to discuss issues/ask questions; submit assignments; take exams; and email other students and the instructor. To preview how an online course works, visit the Ecampus Course Demo (http://ecampus.oregonstate.edu/coursedemo). For technical assistance, see http://ecampus.oregonstate.edu/services/technical-help.htm.

- Course Content Materials
• Computer Lab Materials
• Discussion Boards
• Homework Assignments
• Exams
• Final Project

Homework. Many of the homework assignments will require that you use R to perform data analyses, and that you write summaries of those analyses. You should fashion your write-ups as reports to a supervisor: they should be typed and well-organized; raw computer output should not generally be included, but rather summarized in words or using a table. Plots or other output should be inserted into your write-up at the appropriate junctures. There will be a closing time after which each homework assignment will no be accepted—please be aware of these times!

Computer labs. These are weekly exercises intended to teach you how to do graphs, data exploration and statistical analyses in a computer package known as R. There is nothing to hand in from the labs, but the material covered in each week’s lab will usually be needed to complete the homework assignment for that week.

R is an open source version of the S programming environment. An easy way to access R is through the university’s Virtual Computer Lab (umbrella); see http://oregonstate.edu/is/mediaservices/scf/virtual-lab for instructions. Students may also download R for use on their own computers; it is freely available for Windows, MacOS, and a variety of UNIX platforms at http://www.r-project.org.

Course grade. Homework, 40%; Midterm, 20%; Project, 10%; Final, 30%.