



Syllabus

Course Description

In this first of a two part course, we will cover basic Descriptive Statistics – learning about visualizing and summarizing data, followed by a “Modeling” investigation where we’ll learn about linear, exponential, and logistic functions. We will learn how to interpret and use those functions with basic Pre-Calculus. These two “units” will set the learner up nicely for the second part of the course: Inferential Statistics with a multiple regression cap.

Both parts of the course are intended to cover the same material as a typical introductory undergraduate statistics course, with an added twist of modeling. This course is also intentionally devised to be sequential, with each new piece building on the previous topics. Once completed, students should feel comfortable using basic statistical techniques to answer their own questions about their own data, using a widely available statistical software package (R).

This course will consist of:

- Instructional videos for statistical concepts broken down into manageable topics.
- Guided questions to help your understanding of the topic.
- Weekly tutorial videos for using R
- Scaffolded learning with Pre-Labs (using R), followed by Labs where we will answer specific questions using real-world datasets.
- Weekly wrap-up questions challenging both topic and application knowledge.

Course Outline

Week One: Introduction to Data

- Why study statistics?
- Variables and data
- Getting to know R and RStudio

Week Two: Univariate Descriptive Statistics

- Graphs and distribution shapes
- Measures of center and spread
- The Normal distribution
- Z-scores

Week Three: Bivariate Distributions

- The scatterplot
- Correlation

Week Four: Bivariate Distributions (Categorical Data)

- Contingency tables
- Conditional probability
- Examining independence

Week Five: Linear Functions

- What is a function?
- Least squares
- The Linear function – regression

Week Six: Exponential and Logistic Function Models

- Exponential data
- Logs
- The Logistic function model
- Picking a good mode

Grading Policy

Videos, Readings, and Comprehension Checks are worth **20%** of your grade. Pre-Labs are worth **15%**; Labs are worth **30%**; and Problem Sets are worth **35%** of your grade. A final score of 70% or more is a passing grade to receive the course certificate.

There are no formal due dates for course assignments. However, to receive the maximum benefit from the course, we suggest that you complete each chapter's coursework by noon on the Tuesday on which the next chapter opens.

In order to receive your certificate of completion, you must submit all coursework (and receive a passing grade) by midnight on Monday, March 14.

Texts & Software

We will be using a custom created open source text that will be embedded into the edX course as PDF readings. Your reading assignments will be released weekly with links to the appropriate PDF readings. The current reading assignments (including the optional reading assignments) are also available under the "Readings" tab.

You will need to install R and RStudio onto the computer you will be using for the course.

Instructions for downloading the software can be found [here](#) (Mac users) or [here](#) (Windows users) as well as on the sidebar of the "Course Info" page and the "Download R and RStudio" page.

Pre-Labs & Labs

Each week includes an instructional component, R tutorial videos, a Pre-Lab, and a Lab exercise to give you an opportunity to see statistics in action and to help you learn how to apply the statistics to answer a real world question.

Before each Lab, there will be a Pre-Lab that offers guided instruction processes to help you answer the questions. Each Pre-Lab and Lab is focused around a particular question. You will (1) Reflect on the Question, (2) Analyze the Data, and (3) Draw Conclusions.

The **Reflect on the Question** sections always begin by examining the question to see what it's really asking. In the Pre-Labs, you will examine the variables of interest and correctly categorize them as well as answer a few questions about the method you will use in Lab. In this section of the Labs, you will answer more specific questions about the method you're using.

In **Analyze the Data**, you will learn how to apply the correct statistical tool to help answer the question as well as how to run a script and interpret your results. In the Pre-Labs, this section will be covered over two learning sequence units on the horizontal navigation bar ("Prepare for the Analysis" and "Conduct the Analysis") while only one sequence unit will be used in the Labs ("Analyze the Data").

Draw Conclusions allows you to summarize your findings to give meaning and relevance to answer. In this final section, you are asked to write an answer to the lab question, using the results of your analysis as support. You will use the template we've provided and just fill in the blanks.

Schedule

Foundations of Data Analysis



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