Syllabus

I. Exploring Data: Observing patterns and departures from patterns

*Exploratory analysis of data makes use of graphical and numerical techniques to study patterns and departures from patterns. Emphasis should be placed on interpreting information from graphical and numerical displays and summaries.*

Day 1: Overview Intro to measuring Data
Day 2: Shape, Weirdoes, etc.
Day 3-5: Histograms and Box Plots
Day 6: Transforming Data
Day 7: Computer Lab, Handout on Creating Univariate Data Graphs on Minitab
Day 8: Egg Lab, Using Boxplots and Histograms to determine what makes stores designate eggs as M, L, XL,

And Jumbo? Lab and 2 page explanation of procedures due in 1 week.
Day 9: Describing Distributions aka learning how to CUSS
Day 10-11: Testing Chapters 1-5
Day 12: Density Curves
Day 13: Empirical Rule
Day 14: Standard Normal Curves/z-scores
Day 15: Probability and Normal Curves
Day 16: Normal Probability Plots
Day 17-18: Testing Chapter 6
Day 19: Bivariate Data
Day 20: Scatterplots and Association
Day 21-22: Correlation
Day 23: Regression Equations by hand
Day 24-25: Regression and residual plots
Day 26: Paper Helicopter Lab including full write-up
Day 27: Computer Lab Day to analyze data on Minitab from helicopters
Day 28: Reading Computer Printouts
Day 29-30: Testing Chapters 7-9
Day 31: Modeling Non-Linear Data
Day 32: Handout on linearization of data
Day 33-34: Interpreting Correlation and Regression
Day 35: Gesticulation vs. longevity and other strange relationships
Day 36-37: Relations in Categorical Data
Day 38: Simpson’s Paradox
Day 39: Pendulum Predictions Lab
Day 40-41: Testing Chapter 10

II. Planning a Study: Deciding what and how to measure
Data must be collected according to a well-developed plan if valid information on a conjecture is to be obtained. This plan includes clarifying the question and deciding upon a method of data collection and analysis.

Day 42-43: Designing Samples
Day 44: Election Activity
Day 45-46: Random Rectangles
Day 47-48: Designing Experiments
Day 49: Blocking Designs
Day 50-52: Simulations
Day 53: Estimating Large Populations
Day 54-55: Testing Chapters 11-14

III. Anticipating Patterns: Producing models using probability theory and simulation

Probability is the tool used for anticipating what the distribution of data should look like under a given model.

Day 56: Probability Models
Day 57: Independence and Multiplication
Day 58: Probability Rules
Day 59-60: Conditional Probability
Day 61: Bayes Theorem and Tree Diagrams
Day 62: Probability Trees and Bayes Theorem
Day 63: Law of Large Numbers
Day 64-65: Chapter 15 Test
Day 66: Random Variables and Probability Distributions
Day 67: Expected Values of Random Variables
Day 68: Variance and Standard Deviations of Random Variables
Day 69: Rules for Combinations of Means and Variances of Random Variables
Day 70-71: Chapter 16 Test
Day 72: Introduction to Binomial Distributions
Day 73-75: Binomial Distribution conditions and probability
Day 76-78: Geometric Distributions
Day 79-80: Other Distributions (Poisson, Hyper-Geometric, Uniform)
Day 81: Chapter 17 Test
Day 82: Sampling Distributions
Day 83-84: Sample Proportions
Day 85-86: Sample Means
Day 87: Central Limit Theorem and its Implications
Day 88-89: Chapter 18 Test

IV. Statistical Inference: Confirming Models

Statistical inference guides the selection of appropriate models
Day 90: Confidence Intervals and their purpose
Day 91-92: Jelly Blubbers
Day 93-94: Hypothesis Testing and its Purpose
Day 95-97: Type I Errors, Type II Errors, Power, and their Implications
Day 98-102: Inference for Proportions
Day 103-105: t-procedures
Day 106-107: Matched Pairs
Day 108-109: Two Proportion z-tests
Day 110-111: Two Sample t-tests and Oreos
Day 112: Testing over Chapters 19-25
Day 113-114: Goodness of Fit (chi-squared) Test
Day 115-116: Inference on 2-Way Tables
Day 117-120: Inference for regression
Day 121-122: Testing over Chapters 26-27

Textbook


Tutorials

I offer tutoring from 7:45 AM to 8:15 AM and from 3:45 PM to 4:15 PM every school day and during MegaLunch.

Pedagogy

The textbook provides the layout for the course. Students are expected to have the chapter related to the current topic read. All appropriate grammar rules and lessons learned should be used to communicate complete ideas on any paper that is submitted. Students are expected to use appropriate technology for this course. Use of a graphing calculator is expected throughout the course to provide a tool in analysis of the information.