

DoSS Summer Prep Bootcamp 2024

Methods and Computing

1. Time & Place

July 8 to 26, online synchronous.

2. Instructor

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3. Course Outline

This course will revisit foundational programming principles in R and review of essential concepts in likelihood inference.

4. Textbooks

Primary textbooks:

- *All of Statistics* by L. Wasserman (AoS)
- *Statistical Inference, Second Edition* by George Casella and Robert L. Berger (C&B)

Optional texts:

- *Statistical Models* by A.C. Davison
- *Mathematical Statistics* by K. Knight
- *Theory of Point Estimation* by E.L. Lehmann

5. Tentative Lecture Schedule

The lecture topics and corresponding texts are outlined below. This schedule is tentative and may be changed as the course progresses.

Module	Topics	References
1	R, Rstudio, and Rmarkdown Basic data types and structures	-
2	Reporting, data wrangling and graphing (I) LaTeX, tidyverse	-

3	Reporting, data wrangling and graphing (II) Elementary data analysis ggplot and Github	-
4	Probability distributions Statistical inference (I) Fundamental concepts in inference	AoS Chp 1-5 AoS Chp 6
5	Statistical inference (II) Maximum likelihood estimation	C&B Chp 6.3, 7 AoS Chp 3-4
6	Statistical inference (III) Hypothesis testing	AoS Chp 8 C&B Chap 8
7	Statistical models (I) Linear regression models	AoS Chp 13 C&B Chp 11
8	Statistical models (II) Generalized linear models	C&B Chp 12 AoS Chp 13
9	Simulation and parallel computing	C&B Chap 10 AoS Chp 24
10	Bootstrap	AoS Chp 5