00137960: Statistical Thinking Spring 2025

Lectures: Mondays 8:00–9:50 am and even Wednesdays 3:10–5:00 pm, 501 Classroom Building 2

Instructor: Wei Lin (weilin@math.pku.edu.cn) *Office hours*: Fridays 10:00–11:30 am, 346 Zhihua Building

Teaching Assistant: Shiyun Lin (shiyunlin@stu.pku.edu.cn) *Office hours*: Wednesdays 10:00–11:30 am, 216 Building 21

Course Description:

This course provides a compact and accessible introduction to statistics, focusing on the most important ideas that have shaped the field and have influenced our ways of viewing and understanding the world. Essential concepts including data, models, algorithms, sampling, likelihood, information, hypothesis testing, regression, and causality will be motivated and introduced. A comparative overview of frequentist and Bayesian inference will be presented. The discussion will be illustrated by examples from the physical, biological, and social sciences.

References:

- 1. Poldrack, R. A. (2023). *Statistical Thinking: Analyzing Data in an Uncertain World*. Princeton University Press. A free version of the book is available at https://statsthinking21.org/.
- 2. Efron, B. and Hastie, T. (2021). *Computer Age Statistical Inference: Algorithms, Evidence, and Data Science* (student ed.). Cambridge University Press.
- 3. Cox, D. R. (2006). Principles of Statistical Inference. Cambridge University Press.
- 4. Stigler, S. M. (2016). The Seven Pillars of Statistical Wisdom. Harvard University Press.
- 5. Salsburg, D. (2001). *The Lady Tasting Tea: How Statistics Revolutionized Science in the Twentieth Century*. W. H. Freeman and Company.
- 6. Porter, T. M. (2020). The Rise of Statistical Thinking, 1820–1900 (new ed.). Princeton University Press.
- 7. Lin, X., Genest, C., Banks, D. L., Molenberghs, G., Scott, D. W. and Wang, J.-L. (eds) (2014). *Past, Present, and Future of Statistical Science.* CRC Press.

Homework:

There will be several homework assignments due in class. If you missed the class, contact the TA to turn in your homework by the end of the day. No late homework will be accepted.

Exams:

There will be a closed-book final exam on Monday, June 16, 8:30–10:30 am. Each student should also write a report (due May 26) of no more than 5 pages on an idea, principle, or method that plays a key role in the development of statistics.

Grading:

The course grade breaks down as follows: homework 30%, report 30%, and final exam 40%.

Website:

Lecture topics and homework assignments will be posted on the course website at http://www.math.pku. edu.cn/teachers/linw/37960s25.html.