



STAT 550, Techniques of Statistical Consulting

2023/24, Term 2 (Jan 8, 2024 – Apr 12, 2024)

Time and Place: Wed/Fri, 2:30pm - 4:00pm

Co-Instructors: Daniel McDonald and Lang Wu

Co-Instructor (writing): Estella Qi

Description: Course activities will include reviews of common statistical methods and models, practice of communication skills, and case studies. Communication skills include oral and written presentation skills to *non-statisticians*. Case studies will be based on former and current projects submitted to STAT 550, from our Applied Statistics and Data Science Group (ASDa), consulting projects of statistics faculty, and other sources. For each case study, the practical problem will be presented and students will be required to participate in:

- formulation of problems in practical contexts,
- written and oral presentations of proposed approaches,
- data management, data exploration and model building,
- written and oral presentations of results of analyses,
- critical and interactive discussion of all aspects of the case study.

In addition, students will learn about the broad role of statistics in science through reading and discussion of published studies and real case studies on applied statistics from a range of sources, including the medical, biological and the wider scientific literature.

Objectives: The overall objective of this course is to train students to apply their statistical knowledge, to develop the skills required to work with *non-statisticians* either as consultant or collaborator, and to communicate effectively, both orally and in writing, with non-statisticians. Specific objectives are to provide simulated and real exposure to the process of statistical consultation and thereby to develop:

- the techniques required to attain a clear understanding of a client's needs,
- the oral and written skills that facilitate communication with clients,
- the ability to write succinct, comprehensive and understandable reports,
- a working knowledge of the aids, hard and soft, required in consultation,
- an understanding of the processes involved in solving statistical problems,
- an awareness of the knowledge base that underlies statistical consulting.

Practical Prerequisites: A substantial background in the statistical sciences, good oral and written communication skills, and an interest in statistical consultation.

Evaluation: Class participation and discussion: 20%, Homework (group): 30%, Projects (individual): 30%, Oral presentation (individual): 20%. The final grades will be the averages of the scores from the first half and the second half of the course. Each student will get only one presentation grade and one project grade.

Instructor office hour: TBA

Recommended Reading:

C. Chatfield (1995). *Problem Solving: A Statistician's Guide*, 2nd edition. Chapman & Hall.

G. van Belle (2002). *Statistical Rules of Thumb*. Wiley

B.S. Everitt and T. Hothorn (2010). *A Handbook of Statistical Analyses Using R*, 2nd edition, Chapman & Hall.

Notes:

1. Stat 550 is **required** of all Statistics graduate students, although students with equivalent coursework or consulting experience may apply for an exemption.
2. Stat 550 is graded on the usual numerical scale.
3. Stat 550 (and 551) develop the skills required for employment as an ASDa RA and for success in jobs involving applied work in statistics (including academic positions).