

Syllabus

Course Web Page: <https://edoras.sdsu.edu/~babailey/stat672>
and canvas.sdsu.edu

Meeting Time: Lectures: MW 5:30 - 6:45 p.m. in GMCS 308

Instructor: Professor Barbara Bailey
GMCS 513
email: bbailey@sdsu.edu
Office Hours: M 4:00-5:00 p.m.; by appointment (OH will be virtual. See Canvas for information.)

Reference: The textbook for the course is

Hollander, M., Wolfe, D. A., and Chicken, E. (2014). *Nonparametric Statistical Methods*, 3rd Edition.
John Wiley & Sons, Inc.

Free eBook in SDSU library. See Canvas for the link.

Catalog Description: Theory and application of commonly used distribution-free test statistics, including sign and Wilcoxon tests, and corresponding nonparametric point and interval estimators. Kruskal-Wallis and Friedman tests for analysis of variance, nonparametric regression methods, and other selected topics.

Objectives: Nonparametric statistical methods combine the theory and application of commonly used distribution-free test statistics, density and function estimation methods. Analysis of data from problems in many fields such as agricultural science, biology, education, engineering environmental science, medicine, physics, and psychology are some important examples. This course will provide you with the basic theory and computing tools to perform nonparametric tests including the sign test, Wilcoxon signed rank test, and Wilcoxon rank sum test, as well as the corresponding nonparametric point and interval estimation. Kruskal-Wallis and Friedman tests for one-way and two-way analysis of variance, multiple comparisons, dispersion and independence problems are other nonparametric tests covered. Other topics include estimation methods for nonparametric density estimation, regression, and computing as they relate to nonparametric statistics and bootstrapping.

Learning Outcomes:

- Summarize data using both graphical and numerical methods for use in nonparametric statistical methods.
- Formulate, test and interpret various hypothesis tests for location, scale, and independence problems.
- Use statistical methods, including nonparametric bootstrapping, to construct and interpret interval estimators for population medians and other population parameters based on rank-based methods.
- Characterize, compare, and contrast different nonparametric hypothesis tests.
- Produce and interpret statistics and graphs, using nonparametric density estimation and nonparametric function estimation techniques.
- Present and communicate, both orally and in written-form, the results of statistical analyses of nonparametric data.

Homework: Homework assignments will be regularly available on the course web page as announced in class. The homework will contain a series of practice problems of which *selected problems* will be graded. The homework serves as a tool to review and practice the material covered in class. All material covered on the assignments can be questioned on the exams. Some problems may require computing and must include concise computer output with a clearly presented version of your code.

Late homework will not be accepted. You may drop your lowest percentage score.

Exams: There will be one in-class midterm Wednesday, October 13, with a take-home portion due approximately the same week. The in-class part of the exam will be closed book. A hand calculator is necessary for all exams. *No collaboration of any kind is allowed on the take-home part of the exam.*

No makeup exams are given - no exceptions.

The final exam will be given Friday, December 10 from 3:30 p.m. to 5:30 p.m. in GMCS-308. The final will be cumulative and comprehensive.

Project: As part of the course you will be asked to do a project. The project grade will be based in part on a brief 3-5 page written report in journal style format (i.e., 12 *pt* font, one inch margins, single-spaced, figures and tables clearly presented and labeled at the end of the abstract, page limit does not include figures, tables, nor bibliography) and a brief 5 minute presentation (depending on the size of the class) during the last full week of classes.

You are required to attend *all* project presentations. Attendance at the presentations will be a part of your project grade.

The project will be done individually. You will illustrate and present the importance of nonparametric statistical concepts in the literature. In consultation with me, you may choose a journal article of interest to you. As part of the project, expect to read the journal article, write a report, and give an oral presentation to demonstrate a thorough understanding of and to illustrate the techniques/methods used in the article.

Grading: The grade for the class is based on a score composed of the following.

Homework	30 %
Midterm Exam	30 %
Project	10 %
Final Exam	30 %

Topics to be covered: basic outline; topics may be added and/or dropped as the semester proceeds.

1. Dichotomous Data
 - a. Binomial Tests
 - b. Point Estimation and Confidence Intervals
2. One-Sample Location Problems
 - a. Sign Rank Test
 - b. Sign Test
 - c. Point Estimation and Confidence Intervals
3. Two-Sample Location Problems
 - a. Rank Sum Test
 - b. Point Estimation and Confidence Intervals
4. One-Way Layout and Two-Way Layout
 - a. Kruskal-Wallis and Friedman tests
 - b. Multiple Comparisons

5. Independence Problems
 - a. Efron's Bootstrap
6. Regression and Density Estimation Problems
 - a. Smoothers and Kernels
 - b. Density Estimation

Prerequisites: A calculus-based statistics course (STAT 551B or 670B).

Tardiness and Early exits: The class time is from 5:30 - 6:45 p.m. As common courtesy to your fellow students, we would appreciate if you show up to class on time and leave when dismissed at 5:15. If you must leave early, please inform me and sit on the aisle near an exit so as not to disturb students listening to and trying to learn from the lectures.

Other information: See course web page: <https://edoras.sdsu.edu/~babailey/stat672>

UNIVERSITY POLICIES

Accommodations: If you are a student with a disability and are in need of accommodations for this class, please contact Student Ability Success Center at (619) 594-6473 as soon as possible. Please know accommodations are not retroactive, and I cannot provide accommodations based upon disability until I have received an accommodation letter from Student Ability Success Center.

Student Privacy and Intellectual Property: The [Family Educational Rights and Privacy Act](#) (FERPA) mandates the protection of student information, including contact information, grades, and graded assignments. I will not post grades or leave graded assignments in public places. Students will be notified at the time of an assignment if copies of student work will be retained beyond the end of the semester or used as examples for future students or the wider public. Students maintain intellectual property rights to work products they create as part of this course unless they are formally notified otherwise.

Religious observances: According to the University Policy File, students should notify the instructors of affected courses of planned absences for religious observances by the end of the second week of classes.

Medical-related absences: Students are instructed to contact their professor/instructor/coach in the event they need to miss class, etc. due to an illness, injury or emergency. All decisions about the impact of an absence, as well as any arrangements for making up work, rest with the instructors. [Student Health Services](#) (SHS) does not provide medical excuses for short-term absences due to illness or injury. When a medical-related absence persists beyond five days, SHS will work with students to provide appropriate documentation. When a student is hospitalized or has a serious, ongoing illness or injury, SHS will, at the student's request and with the student's consent, communicate with the student's instructors via the Vice President for Student Affairs and may communicate with the student's Assistant Dean and/or the [Student Ability Success Center](#).

SDSU Economic Crisis Response Team: If you or a friend are experiencing food or housing insecurity, or any unforeseen financial crisis, visit sdsu.edu/ecrt, email ecrt@sdsu.edu, or walk-in to Well-being & Health Promotion on the 3rd floor of Calpulli Center.

Resources for students: A complete list of all academic support services--including the [Writing Center](#) and [Math Learning Center](#)--is available on the Student Affairs' [Academic Success](#) website. [Counseling and Psychological Services](#) (619-594-5220) offers confidential counseling services by licensed therapists; you can Live Chat with a counselor at http://go.sdsu.edu/student_affairs/cps/therapist-consultation.aspx between 4:00pm and 10:00pm, or call San Diego Access and Crisis 24-hour Hotline at (888) 724-7240.

Academic Honesty: The University adheres to a strict [policy prohibiting cheating and plagiarism](#). Examples of academic dishonesty include but are not limited to:

- copying, in part or in whole, from another's test or other examination;
- obtaining copies of a test, an examination, or other course material without the permission of the instructor;
- collaborating with another or others in work to be presented without the permission of the instructor;
- falsifying records, laboratory work, or other course data;
- submitting work previously presented in another course, if contrary to the rules of the course;
- altering or interfering with grading procedures;
- assisting another student in any of the above;
- using sources verbatim or paraphrasing without giving proper attribution (this can include phrases, sentences, paragraphs and/or pages of work);
- copying and pasting work from an online or offline source directly and calling it your own;
- using information you find from an online or offline source without giving the author credit;
- replacing words or phrases from another source and inserting your own words or phrases.

The California State University system requires instructors to report all instances of academic misconduct to the Center for Student Rights and Responsibilities. Academic dishonesty will result in disciplinary review by the University and may lead to probation, suspension, or expulsion. Instructors may also, at their discretion, penalize student grades on any assignment or assessment discovered to have been produced in an academically dishonest manner.

Classroom Conduct Standards: SDSU students are expected to abide by the terms of the [Student Conduct Code](#) in classrooms and other instructional settings. Prohibited conduct includes:

- Willful, material and substantial disruption or obstruction of a University-related activity, or any on-campus activity.
- Participating in an activity that substantially and materially disrupts the normal operations of the University, or infringes on the rights of members of the University community.
- Unauthorized recording, dissemination, or publication (including on websites or social media) of lectures or other course materials.
- Conduct that threatens or endangers the health or safety of any person within or related to the University community, including
 1. physical abuse, threats, intimidation, or harassment.
 2. sexual misconduct.

Violation of these standards will result in referral to appropriate campus authorities.