Instructor info:  
Benjamin Cooper Boniece  
(he/him/his)  
Email: bcboniece@math.utah.edu  
Office: JWB 130

Lecture info:  
Time: M/W 02:30PM-04:00PM  
Location: James Talmage (JTB) 140  
The classroom has recently changed; please check class schedule

Important Note: For additional details, resources, information on office hours, and the most up-to-date information regarding important class dates, please refer to the Canvas page.

Course Description: Part II of an introductory course in mathematical statistics. Topics include interval estimation, hypothesis testing, likelihood method, errors, optimality, order statistics, nonparametric methods, rank statistics.

Prerequisites: Statistical Inference I (Math 5090/6824).

Text: There is no required text for this course. Occasionally, homework problems will be taken from the text used last semester: Introduction to Probability and Mathematical Statistics, 2nd Edition.

→ Authors: Lee J. Bain and Max Engelhardt.

Grade distribution:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>30%</td>
</tr>
<tr>
<td>Midterm Exams (2)</td>
<td>40% (20% each)</td>
</tr>
<tr>
<td>Final Exam</td>
<td>30%</td>
</tr>
</tbody>
</table>

Grade scale:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>[93,100]</td>
</tr>
<tr>
<td>A-</td>
<td>[86,93]</td>
</tr>
<tr>
<td>B+</td>
<td>[80, 86]</td>
</tr>
<tr>
<td>C+</td>
<td>[68,74]</td>
</tr>
<tr>
<td>C</td>
<td>[60,68]</td>
</tr>
<tr>
<td>B</td>
<td>[58,60]</td>
</tr>
<tr>
<td>C-</td>
<td>[55,60]</td>
</tr>
<tr>
<td>D</td>
<td>[50,55]</td>
</tr>
<tr>
<td>E</td>
<td>[0,50]</td>
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</tbody>
</table>

No grades will be rounded for any reason.

Goals and Scope:

This course is about statistical inference and the mathematical theory that supports it. We will mostly focus on the setting where data is “i.i.d.,” meaning observed data is
assumed to be independent and identically distributed. Time-permitting, we will discuss some extensions of statistical methods to non-iid settings.

As a discipline, mathematical statistics is quite broad. In 5090/6828, will be focusing on a variety of topics ranging from confidence intervals, hypothesis testing, bootstrapping & Monte Carlo simulation, and nonparametric inference. At the end of this course, everyone will

- Understand some core concepts underlying modern statistical theory.
- Have familiarity with fundamental resampling methods and basic Monte Carlo techniques.
- Have a solid foundation for understanding more sophisticated statistical concepts.

Important note #1: In this course, we will occasionally use examples and explore statistical concepts using the statistical programming language R. No familiarity or background with R will be assumed; details regarding R and its role in our course will be discussed in class.

Important note #2: This is not a course in applied statistics. By design, this course is meant to be theory-focused with some level of mathematical rigor. However, having a good grasp of both theory and applications is important for anyone interested in data sciences. If you are looking instead to enroll in an applied statistics course, please contact me for possible alternatives.

Course policies:

General

- This course will be held in person. Except in cases of ADA accommodations or quarantining due to COVID-19 exposure or infection or other health-related reasons, you will be expected to attend class in person. Changes to this policy are up to the discretion of the instructor.

- No late homework will be accepted; one homework assignment will be dropped at the end of semester.

- Exceptions are made only in extreme circumstances. For more details, please see section entitled Accommodations in the Canvas page.

- If you have trouble submitting your work through Gradescope, please contact me prior to the assignment deadline.
  - If you insufficient time to fix the issue before the deadline passes, to ensure you receive credit for the assignment, please email me a copy of your work.
Homework

- Homework assignments will be completed through Gradescope.
- Assignments will be graded based on a mixture of completeness and correctness.
- While it is acceptable to briefly discuss individual assignments with your classmates, your work must reflect your personal understanding of the material (identical solutions will not be accepted or tolerated).
- Re-grades: Students have only one week to request the regrading of an assignment or an exam after the time that this has been returned to the class.

Exams

- Tentative midterm exam dates will be set during the first week of class. For up-to-date information on exam dates, please refer to Canvas. The final exam date has been set. As of January 9, 2022, the exam dates are:
  - Midterm 1: (To be set first week of class)
  - Midterm 2: (To be set first week of class)
  - Final Exam: Monday, May 2, 1:00 – 3:00 pm

Academic Honesty

- All students are expected to comply with the University of Utah’s student code.

Accommodations

- Accommodations will be considered on an individual basis and may require documentation.
- See also General University Policies, below.

Covid-19 University Policies

All students are expected to comply fully with university policies regarding Covid-19 protocols and safety. On January 7th, Salt Lake County issued a county-wide mandatory masking order in effect until at least February 7th, which applies to the University of Utah.

Additionally, in the event of a Covid-19 exposure in our class, some may be required to self-isolate following an exposure per university guidelines. Accommodations will be made so as to allow any students unable to attend class during following an exposure to participate remotely. For details on masking policies, please see here https://attheu.utah.edu/facultystaff/new-covid-19-protocols-on-campus/. For all details on Covid-19-related policies, please refer to https://coronavirus.utah.edu/.
General University Policies

The following five items are standard syllabus items not directly related to Covid. Note, however, that some of the services described may be available only on a modified or limited basis due to the Covid pandemic. Check online or call the relevant unit for up-to-date information.

The Americans with Disabilities Act: The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability & Access, 162 Olpin Union Building, 801-581-5020, disability.utah.edu. CDA will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in alternative format with prior notification to the Center for Disability & Access.

Addressing Sexual Misconduct: Title IX makes it clear that violence and harassment based on sex and gender (which includes sexual orientation and gender identity/expression) is a Civil Rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veteran’s status or genetic information. If you or someone you know has been harassed or assaulted on the basis of your sex, office for equal opportunity and affirmative action including sexual orientation or gender identity/expression, you are encouraged to report it to the University’s Title IX Coordinator; Director, Office of Equal Opportunity and Affirmative Action, 135 Park Building, 801-581-8365, oeo.utah.edu or to the Office of the Dean of Students, 270 Union Building, 801-581-7066, deanofstudents.utah.edu. For support and confidential consultation, contact the Center for Student Wellness, 426 SSB, 801-581-7776. To report to police, contact the Department of Public Safety, 801-585-2677(COPS), police.utah.edu.

Campus Safety: The University of Utah values the safety of all campus community members. To report suspicious activity or to request a courtesy escort, call campus police at 801-585-COPS (801-585-2677). You will receive important emergency alerts and safety messages regarding campus safety via text message. For more information regarding safety and to view available training resources, including helpful videos, visit safeu.utah.edu

University Counseling Center: The UCC staff is committed to supporting the mental health needs of our campus community. Their phone number is 801-581-6826. Their hours are Monday-Friday, 8:00am-5:00pm. For after-hours emergencies, contact the 24/7 Crisis Line: 801-587-3000 . More information is at counselingcenter.utah.edu.
Office of the Dean of Students: The Office of the Dean of Students is dedicated to being a resource to students through support, advocacy, involvement, and accountability. It serves as a support for students facing challenges to their success as students, and assists with the interpretation of University policy and regulations. To contact the Office of the Dean of Students, please email deanofstudents@utah.edu or call 801-581-7066. There is more information at deanofstudents.utah.edu.

Inclusivity

Student Names and Personal Pronouns. Class rosters are provided to the instructor with the student’s legal name as well as “preferred first name” (if previously entered by you in the Student Profile section of your CIS account, which managed can be managed at any time). While CIS refers to this as merely a preference, I will honor you by referring to you with the name and pronoun that feels best for you in class or on assignments. Please advise me of any name or pronoun changes so I can help create a learning environment in which you, your name, and your pronoun are respected. If you need any assistance or support, please reach out to the LGBT Resource Center at lgbt.utah.edu

Diversity and Inclusivity Statement. It is my intent that students from all diverse backgrounds and perspectives be well served by this course, that students’ learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength and benefit. It is my intent to present materials and activities that are respectful of diversity: gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture. Your suggestions are encouraged and appreciated. Please let me know ways to improve the effectiveness of the course for you personally or for other students or student groups. In addition, if any of our class meetings conflict with your religious events, please let me know so that we can make arrangements for you.

Undocumented Student Support Statement. Immigration is a complex phenomenon with broad impact—those who are directly affected by it, as well as those who are indirectly affected by their relationships with family members, friends, and loved ones. If your immigration status presents obstacles to engaging in specific activities or fulfilling specific course criteria, confidential arrangements may be requested from the Dream Center. Arrangements with the Dream Center will not jeopardize your student status, your financial aid, or any other part of your residence. The Dream Center offers a wide range of resources to support undocumented students (with and without DACA) as well as students from mixed-status families. To learn more, please contact the Dream Center at 801.213.3697 or visit dream.utah.edu.