Course Information  
STAT 561: Theory of Statistics (I)  
Fall 2018

General information
Instructor: Duo Jiang  
Email: jiangd@stat.oregonstate.edu  
Office: Weniger 267  
TA: TBD

Lectures
Class meets three times a week for lectures, each lecture lasting 50 minutes.

Recitation
The recitation includes 1 hour of time with GTA and/or instructor (and 1 hour of outside preparation implied). The recitation will be dedicated to (1) going over additional examples to solidify the material that has been presented during lectures, (2) reviewing mathematical and statistical prerequisites to help students come in preparation for future lectures and homework assignments, and (3) working out practice problems to help develop problem solving skills. Each recitation session will also include a question-and-answer period.

Course credit
This course is 4 credits.

Prerequisites
ST 422/522. ST 561, ST 562, and ST 563 must be taken in order.

Course website
We will use Canvas (https://oregonstate.instructure.com/). Please check regularly for homework assignments, handouts, announcements, etc.

Learning resources

Course description
The first quarter of the Theory of Statistics sequence focuses on the theory of probability. The objective of this course is to help students develop a reasonably rigorous command of probability theory as the mathematical foundation for statistical inference, which is the main subject of ST 562 and ST 563. We will cover most of the materials from Chapters 1–4 of the textbook.
Course content

Chapter 1  Basic laws of probability, conditional probability and independence, random variables, distribution functions, density and mass functions
Chapter 2  Functions of random variables, expectations, moment generating functions, differentiations
Chapter 3  Discrete and continuous distributions, exponential families, location and scale families, probability inequalities
Chapter 4  Joint and marginal distributions, conditional distributions, covariance and correlation, multivariate distributions

Learning outcomes

Students will be able to perform probability calculations for both discrete and continuous random variables, including means, variances, moment generating functions, conditional, joint and marginal densities. They will be able to recognize sampling situations calling for the use of models frequently encountered in statistical applications, including the binomial, Poisson, gamma, normal families. They will be able to identify exponential families and apply relevant calculations to these families. They will be able to perform transformations of one or more random variables when appropriate.

Homework

Problem sets will be assigned weekly. Your lowest homework grade will be dropped. Unless otherwise noted, homework is due at the beginning of class on the due date, and are to be submitted in class in hard copies. Late homework will lose 30% if turned in before midnight of the due date, and 50% if turned in on the next day before midnight, and will not be accepted after this.

Homework should be done independently as much as possible. It is fine to discuss them with your classmates, but you always need to write up the solutions on your own. If you get help from someone other than the instructor and the TA, or from some source (e.g. a book other than the required texts) that is directly related to your answers, you should state this clearly in writing on your homework assignment.

Exams

- Midterm 1: TBD
- Midterm 2: TBD
- Final: TBD

All exams are closed-book, but you are allowed to bring a one-page formula sheet.

Evaluation of student performance

Homework, 30%; Midterm 1, 15%; Midterm 2, 15%; Final, 30%. The exam you do best in counts 10% more.

To receive credit for homework and exams you need to always explain your answer, even when this is not explicitly asked. Show all reasonable steps. It is your responsibility to convince the grader (me or the TA) that you understand how to solve the problem.

Academic honesty

Student conduct is governed by the Student Conduct and Community Standards [http://studentlife.oregonstate.edu/sites/studentlife.oregonstate.edu/files/code_of_student_conduct.pdf]. Students are expected to be honest and ethical in their academic work. Any incident of academic dishonesty will be handled according to the University’s Academic Regulations.
Statement regarding students with disabilities

Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at http://ds.oregonstate.edu. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.