

Welcome to BSTA 551!

Jessica Minnier

2026-01-05



Jessica Minnier (she/her)

- Call me “Jessica,” “Dr. M,” “Professor Minnier [MIN-ee-ay],” or any combo!
- Associate Professor of Biostatistics
- This is a “newish” class to me and the program
- Taught 552 Math/Stats II (RIP) for 9 years; Intro to R course developed & taught 3 years
- *About me*
 - SPH, Knight Cancer Institute
 - Research: risk prediction, ’omics, large cohort studies, oncology trials



Welcome

Some important tasks

- Star the class website: https://jessicaminnier.com/BSTA551_W26/
- Complete Homework 0 by this Thursday at 11pm!
 - Poll for office hours set up
- Highly suggest that you make an appointment with a learning specialist through [Student Academic Success Center!](#)



Let's visit the website: Homepage

Theory of Statistical Inference

SCHEDULE SYLLABUS INSTRUCTOR HOMEWORK



BSTA 551: Theory of Statistical Inference

Winter 2026

This course introduces a theoretical foundation of Biostatistics for masters level students focusing on statistical inference. We will study methods of estimation (point and interval), as well as hypothesis testing. Some simulation and bootstrap methods for estimation and testing will be included along with more theoretical asymptotic and finite sample inference methods.

Prerequisites: BSTA 550 Probability, familiarity with R.

| Instructor | Office Hours | Course details | Contact |
|---|---|--|---|
|  Dr. Jessica Minnier |  Charles TBD |  Mondays, Wednesdays | E-mail or OHSU Teams is the best way to get in contact with me. |
|  (see Sakai) |  Charles TBD |  Jan 5 - March 18 | |
|  minnier@ohsu.edu | Jessica  M/W 12pm-12:30pm after class |  10 AM - 12 PM | |
| | |  In-person (see Sakai for room) | |

 [View the source on GitHub](#)



Welcome

Let's visit the website: Syllabus

 Theory of Statistical Inference

SCHEDULE SYLLABUS INSTRUCTOR HOMEWORK

BSTA 551 Syllabus

MODIFIED
January 1, 2026

Key Course Info

- If an assignment on Sakai is closed or you are submitting late work, please email me AND the TA your work
- The in-person class instruction will end on Wednesday, March 11, 2026. All coursework is expected to be completed by Thursday of finals week, March 19, 2026 at 11pm.

Description

Welcome to BSTA 551! In this course we will study the theoretical foundation of statistical inference which includes estimation and hypothesis testing. This is the official course description:

This course introduces theoretical foundation in Biostatistics. Topics will include distributions of random variables (location-scale families and exponential families), data reduction (sufficiency and completeness of statistics), methods of estimation (method of moment estimators and maximum likelihood estimators), convergence, finite and large sample properties of estimators, interval estimation, hypothesis testing, asymptotic tests (likelihood-ratio tests, score tests, and Wald tests), and statistical simulations to evaluate statistical methods.

Course Learning Objectives

At the end of this course, students should be able to...

1. Explain the major concepts and theorems in statistical inference.
2. Connect theoretical concepts to statistical analyses.
3. Conduct simulations to study and evaluate statistical methods.

Instructors

[Here is the instructor page.](#)



Let's visit the website: Schedule (1/2)

- Weeks, class info, homeworks, labs

Theory of Statistical Inference

SCHEDULE SYLLABUS INSTRUCTOR HOMEWORK

Schedule

MODIFIED
January 1, 2026

| Week | Date | Lesson | Topic | TB | Key Info | Slides HTML | Slides PDF | Slides Notes | Exit tix | Recording | Muddy Points |
|------|-------|----------|---|----------|----------|-------------|------------|--------------|----------|-----------|--------------|
| 1 | 01/05 | | Welcome | | | | | | | | |
| | | 1 | Introduction to Statistical Inference; Statistics | 6.1, 6.2 | | | | | | | |
| | 01/07 | 2 | Point estimation; Bias, variance, and MSE of estimators | 7.1 | | | | | | | |
| | 01/08 | | HW 0 due 11pm | | | | | | | | |
| 2 | 01/12 | 3 | Chi-square, t, F distributions | 6.3, 6.4 | | | | | | | |
| | 01/14 | 4 | Unbiased estimators, MVUE | 7.1 | | | | | | | |
| | 01/15 | | HW 1 due 11pm | | | | | | | | |
| 3 | 01/19 | No class | | | | | | | | | |
| | 01/21 | 5 | Likelihood, MLE, MME | 7.2 | | | | | | | |
| | 01/22 | | HW 2 due 11 pm | | | | | | | | |
| 4 | 01/26 | 6 | Sufficient statistics, Fisher Information | 7.3 | | | | | | | |
| | 01/28 | 7 | MLE I Large sample properties | 7.4 | | | | | | | |



Welcome

Let's visit the website: Schedule (2/2)

| | | |
|---|--|---|
|  i | Key Info | I will post announcements and other important class related info here. For example, if I change a due date or discuss a common mistake in homework, I will put it here. |
|  Slides HTML | These are the basic slides that will open in your browser. | |
|  Slides PDF | These are the slides in pdf form for easy note taking. I'm not always the best at posting these before class, so make sure you know how to save your own copy of pdf slides! | |
|  Slides Notes | These are the annotated slides in pdf form. In class, I add my own notes to slides. After class, I will post them here. | |
|  Exit tix | These are links to that day's exit ticket. | |
|  | Recording | I record our classes. This will be a link to the OneDrive folder containing this recording. |
|  ? | Muddy Points | You will have a chance to ask questions about class in your exit tickets. If I notice a trend in confusion, I will add explanations to these "Muddy Points" |
|   | | Welcome |

Let's visit the website: Search

Theory of Statistical Inference

SCHEDULE SYLLABUS INSTRUCTOR HOMEWORK

Schedule

MODIFIED
January 1, 2026

| Week | Date | Lesson | Topic | TB | Key Info | Slides HTML | Slides PDF | Slides Notes | Exit tix | Recording | Muddy Points |
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| | 01/28 | 7 | MLE I Large sample properties | 7.4 | | | | | | | |



Welcome

Let's visit the website: Homework!

Theory of Statistical Inference

SCHEDULE SYLLABUS INSTRUCTOR HOMEWORK

Homework

MODIFIED
January 1, 2026

| Homework | Assignment | Assignment due (@11pm) | Answers | Solutions & videos |
|----------|------------|------------------------|---------|--------------------|
| 0 | | 01/08 | | |
| 1 | | 01/15 | | |
| 2 | | 01/22 | | |
| 3 | | 01/29 | | |
| 4 | | 02/05 | | |
| 5 | | 02/12 | | |
| 6 | | 02/19 | | |
| 7 | | 02/26 | | |
| 8 | | 03/12 | | |
| 9 | | 03/19 | | |

File Naming

- For HW Assignments, please use the following file naming: "HW01_LastName_FirstInitial"
 - For homeworks without R, this should be a pdf file
 - For homeworks with R, this may be a pdf file (with the code in the pdf) or an html file



Welcome

Structure for this course

- Statistics is based on mathematics, which has theoretical underpinnings.
- Understanding the “why” behind why we perform certain hypothesis tests and where our estimates come from.
- Think of this course as paired with the applied courses. There may be a lot of overlap, but we are going deeper with the “why” and “how”
- This used to be two quarters of material, with more proofs and much more calculus. I tried to make this course more digestible in 10 weeks, while also including some simulation/bootstrap/permutation methods. Therefore: topics will go by quickly!! We won’t have time to prove most things, you will have to take a lot of this on face value.
- I agree with Dr. Wakim: “It is going to feel useless at times, but I swear it is not!”



What we will cover

- Point Estimation
- Hypothesis Testing
- Confidence Interval Estimation
- Asymptotic properties of estimators/tests
- Bootstrap/resampling methods



Textbook

Modern Mathematical Statistics with Applications, 3rd ed.

- Author: JL Devore, KN Berk, MA Carlton
- Textbook available online through library
- Citation: Devore JL, Berk KN, Carlton MA. Modern Mathematical Statistics with Applications. Third edition. Springer; 2021. doi:10.1007/978-3-030-55156-8
- Focus on chapters 6-10

