Syllabus

STAT 3202 Introduction to Statistical Inference for Data Analytics

Spring 2026

4 Credit Hours

Course overview

Lectures

WF 12:45pm-2:05pm in Pomerene Hall 250

Recitations

M 12:40pm-1:35pm **or** 1:50pm-2:45pm in Pomerene Hall 155

Instructor

- Name: Yoonkyung Lee
- Office: Cockins Hall 440H
- Office Hours: M 4:10-5:05pm, R 2:00-2:55pm, or by appointment
- Email: lee.2272@osu.edu
- Phone: 614-292-9495

Teaching Assistant

- Name: Matt Humphreys
- Office: Cockins Hall 320
- Office Hours: W 10:20-11:15am online and 1:50-2:45pm in Pomerene 151. Zoom link for TA's online office hours is available on Carmen.
- Email: humphreys.92@buckeyemail.osu.edu

Course webpage

The course has a web page on Carmen (https://carmen.osu.edu/). You will find the class schedule, course announcements, lecture notes, lab and homework assignments, and other information about the class on the web page. Please check it out on a regular basis.

Course description

The course covers foundational inferential methods for learning about populations from samples, including point and interval estimation, and the formulation and testing of hypotheses. Statistical theory is introduced to justify the approaches. The course emphasizes challenges that arise when applying classical ideas to big data, partially through the use of computational and simulation techniques.

Course expected learning outcomes

By the end of this course, students should successfully be able to:

1. Compare the performance of estimators via bias, mean squared error, consistency, and sufficiency
2. Use Monte Carlo simulation to examine the performance of estimators and testing procedures
3. Propose estimators via the method of moments and maximum likelihood estimation
4. Use the Central Limit Theorem to model the sampling distribution of a sample mean
5. Conduct hypothesis tests on mean and variance parameters, including t-tests, chi-square tests, and F tests
6. Determine and interpret the power and type-II error of a test
7. Use bootstrapping to conduct inference
8. Perform nonparametric hypothesis tests on mean parameters

Prerequisites

C- or better in Stat 3201 (Introduction to Probability for Data Analytics) or permission of the instructor

Attendance policy

You are expected to attend all lectures and recitations.

Textbooks

Required

Mathematical Statistics with Applications, 7th edition, by Wackerly, Mendenhall, and Scheaffer, Brooks/Cole, Cengage Learning, 2008.

The textbook for this course is being provided via CarmenBooks. Through CarmenBooks, students obtain publisher materials electronically through Carmen/Canvas. You can access this eBook through the **CarmenBooks** reader link in the course navigation of the Carmen course for this class. For more information on the program or information on how to opt out, please visit the CarmenBooks website.

Computing

You will be required to use the statistical software package R for your lab assignments. The RStudio IDE (integrated development environment) is an easy-to-use interface to R. RStudio requires R to be installed. Both R and RStudio are free, open-source software and can be downloaded from the following websites. Your TA will help you learn to use R for statistical analysis during recitation, but you should also expect to put in time outside of recitation doing data analysis and computing with R.

R: www.r-project.org

RStudio: posit.co

Additional information on R will be provided on the course website.

Grading

Your course grade will be assigned on the basis of performance on lab assignments, quizzes, two midterms, and a comprehensive final exam.

How your grade is calculated

Category	Percentage
Lab Assignments	20%
Quizzes	10%
Midterm 1	20%
Midterm 2	20%
Final exam	30%
Total	**100%**

Grading scale

The following grading scale will be used:

93–100: A

90–92.9: A-

87–89.9: B+

83–86.9: B

80–82.9: B-

77–79.9: C+

73–76.9: C

70 –72.9: C-

67 –69.9: D+

60 –66.9: D

Below 60: E

While this grading scale generally applies, final grades may be curved upwards.

Lab assignments

Labs will be conducted every week on Mondays. Most weeks a lab assignment will be introduced during recitation, incorporating recent lecture topics with coding. You are encouraged to collaborate on lab assignments, but ultimately the work you submit must be your own. Labs will be completed in R Markdown and must be compiled into organized, professional PDF documents. Relevant plots should be included and labeled, code should be organized and clear and supporting answers and text should be properly formatted and professionally written.

We don't expect you to complete lab activities during recitation, but we will always allow time during recitation for you to get started on lab activities, talk through the activities with your peers, and get immediate assistance from your teaching assistant. You will then submit your final work through Carmen on the following Saturday, by 11:59pm. Late assignments will be accepted for 24 hours after the original due date with a 1% deduction per hour. After this, no late assignments will be accepted.

The recitations will be graded out of 20 points based on both completion and accuracy, and you can find the instruction in each assignment sheet posted on Carmen. At the end of the semester, the two lowest recitation grades will be dropped.

Homework

Homework problems will be assigned for each topic covered in the course, and solutions to all assigned problems will be posted. Homework will not be collected or graded.

Quizzes

Short quizzes (5 in total) will be given approximately every other week in class. Each quiz will consist of one problem taken directly from the assigned homework. Quizzes are to be completed on your own without any external help or communication. No notes may be used on quizzes. The lowest quiz score will be dropped from the recorded grades.

Exams

There will be two midterms and one final exam to assess your understanding of the course material. The final exam will take place at the time and date established by the University. The final exam will be cumulative but will emphasize the more recent material. Information about the exams will be posted well in advance on Carmen and also announced in class. Exams must be completed without any external help or communication.

Generally, make-up exams will not be given. However, they may be given in case of an emergency or exceptional circumstances (serious illness, unexpected family situations, etc.) or due to conflicts with other university activities, provided that proper documentation is submitted in advance.

Academic policies

The link below provides academic policies and statements from the Office of Undergraduate Education:
https://ugeducation.osu.edu/academics/syllabus-policies-statements/standard-syllabus-statements

Please read the statements about academic integrity in particular.

Copyright for instructional materials

The materials used in connection with this course may be subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course. Copyright law must be considered before copying, retaining, or disseminating materials outside of the course.

Course schedule (tentative)

Please note that topics covered may change depending on the pace of the course. Any change in due dates or exam dates will be officially announced in class and also posted on the course website.

Week	Date	Topics	Sections
1	1/12 (M)	Lab 1: Creating R Markdown reports	
	1/14 (W)-1/16 (F)	Course intro, introduction to statistical inference, point estimation	Ch.7, 8.1, 8.2
2	1/19 (M)	Martin Luther King Jr. Day (No recitation)	
	1/21 (W)-1/23 (F)	Bias, mean squared error, common unbiased point estimators	8.2, 8.3
3	1/26 (M)	Lab 2: Sampling distributions	
	1/28 (W)-1/30 (F)	Consistency, sufficiency Quiz 1	9.3, 9.4

Week	Date	Topics	Sections
4	2/2 (M)	Lab 3: CLT, Bias and MSE	
	2/4 (W)- 2/6 (F)	Method of moments estimation, maximum likelihood estimation Quiz 2	9.6, 9.7
5	2/9 (M)	Lab 4: Consistency	
	2/11 (W) 2/13 (F)	Review for Exam 1 Exam 1	
6	2/16 (M)	Lab 5: Computational likelihood maximization	
	2/18 (W)- 2/20 (F)	Interval estimation, confidence intervals for means	8.5, 8.6, 8.8
7	2/23 (M)	Lab 6: Coverage of confidence intervals	
	2/25 (W)- 2/27 (F)	Confidence intervals for a difference in means and for paired data Quiz 3	8.8
8	3/2 (M)	Lab 7: Confidence intervals for means	

Week	Date	Topics	Sections
	3/4 (W)- 3/6 (F)	Confidence intervals for proportions and a difference in proportions	
9	3/9 (M)	Lab 8: Confidence intervals for proportions	
	3/11 (W)- 3/13 (F)	Introduction to hypothesis testing, type I and type II errors, p-values	10.1-10.3
	3/16 (M)- 3/20 (F)	Spring Break	
10	3/23 (M)	Lab 9: Type I error	
	3/25 (W) 3/27 (F)	Review for Exam 2 Exam 2	
11	3/30 (M)	Lab 10: p-values, type I error and type II error	
	4/1 (W)- 4/3 (F)	Hypothesis testing, p-values, power, tests on means	10.5-10.7
12	4/6 (M)	Lab 11: Power and type II error	
	4/8 (W)- 4/10 (F)	Hypothesis tests on variances Quiz 4	10.8

Week	Date	Topics	Sections
13	4/13 (M)	Lab 12: Power of hypothesis tests	
	4/15 (W)- 4/17 (F)	Nonparametric tests Quiz 5	15.1-15.4
14	4/20 (M)	Lab 13: Comparison of methods for testing hypotheses	
	4/22 (W)- 4/24 (F)	Bootstrap	
15	4/27 (M) 4/30 (R)	Review for Final Final exam: 12:00-1:45pm	

Disclaimer

This syllabus should be taken as a fairly reliable guide for the course content. However, you cannot claim any rights from it and in particular we reserve the right to change due dates or the methods of grading and/or assessment if necessary. Any changes will be communicated to you through official course announcements.