

STAT 431/511: STATISTICAL INFERENCE

COURSE INFORMATION AND SYLLABUS

Lectures. Lectures will be held at 350 JMHH (Jon M. Hunstman Hall). There are two sections:

- Section 401: Monday and Wednesday, 1:30 PM–3:00 PM
- Section 402: Monday and Wednesday, 3:00 PM–4:30 PM

Instructor. Bhaswar B. Bhattacharya

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Office Hours: Monday, 4:30 PM–5:30 PM

Teaching Assistant. Somabha Mukherjee

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Office Hours: Tuesday, 4:30 PM–5:30 PM, at G92 JMHH, and Friday, 12:00 PM–1:00 PM, at F96 JMHH.

Course Description and Syllabus. This course offers an advanced undergraduate level exploration of statistical techniques and their theoretical justifications. The following is a list of topics that will be covered in the class:

- Collecting, summarizing and visualizing data
- Distribution of sampling statistics
- Point estimation and Confidence intervals
- Hypothesis Testing
- Inference with two populations
- Goodness of fit
- Regression (Simple Linear Regression, Multiple Regression, Anova)
- Maximum Likelihood
- Non-parametric methods

Prerequisites. STAT 430. Students are expected to be fluent with quantitative probabilistic reasoning and analysis (for example, probability distributions and densities, jointly distributed random variables, conditional probability, independence, correlation and covariance, normal and binomial

distributions, central limit theorems). Prior programming experience is not required.

Text. *Statistics and Data Analysis*, Ajit C. Tamhane & Dorothy D. Dunlop. We will cover selected topics from Chapters 3-15. We will not have time to cover all details and examples. The students should read along in the textbook to gain most from the class. Exams will only cover topics discussed in class; however, students are responsible for keeping track of which topics are covered and which are not.

Homework. There will be four homeworks, assigned approximately triweekly. Homeworks will generally be due on Wednesdays and must be handed in during class or in the BBB's mailbox (located on the 4th floor of JMHH) by 5:00 PM on the date the assignment is due. *No late homework will be accepted, but the lowest score will be dropped.*

Exams. There will be 2 midterms and a final exam, scheduled for the following dates:

- Midterm 1:
 - Date: Monday, October 1
 - Time: In class
 - Place: 350 JMHH
- Midterm 2:
 - Date: Wednesday, November 7
 - Time: In class
 - Place: 350 JMHH
- Final:
 - Date: Thursday, December 13
 - Time: 6:00 PM-8:00 PM
 - Place: TBD

Students are expected to show up for all the exams at the times specified above. *All exams will be closed book with a small number of "cheat sheets" allowed, and each student should also bring a personal calculator.*

Grading. The course grade will be based on the homework, the midterm, and the final.

- Homework: 10% (lowest score dropped)
- Midterm 1: 25%
- Midterm 2: 25%
- Final: 40%

Collaboration policy. Working together on homework is allowed and encouraged. However, students must write up their homework solutions by themselves. Names of collaborating students should be provided on the front page of each homework write-up.

Statistical computing. Few homework assignments will involve coding and statistical analysis on datasets provided. It is recommended that students download and use R for this purpose.