

Math 37700: Applied Statistics and Probability, Fall 2020

TR 6:30 – 7:45 PM, Zoom

Instructor: Shirshendu Chatterjee

Office: NAC 4/114B

shirchat1@gmail.com

Grader: TBD

Prerequisites Math 375 and Math 376 as well as some elementary linear algebra. Math 376 can be taken concurrently.

Office hours: Thursdays 5:15 pm – 6:15 pm

Course Description

This course will cover selected topics in applied and computational probability and statistics. A secondary purpose is to develop elementary facility in designing and implementing statistical and probabilistic algorithms. Computation will be done using the R software. (Although students can prepare or submit code in other languages ? please discuss this with me before you do so). The course is self-contained, assuming an elementary facility with probability, calculus, and linear algebra. Programming experience is desirable but not necessary (i.e., if you haven't yet learned: here is an opportunity). We will begin with elementary topics and gradually move on to more advanced ideas as the semester progresses.

Text: There is no text, and the classroom notes and homework assignments will form the material of the course. Some reference books, which would be helpful, are

The R Book (second edition) by Michael J. Crawley

Linear models with R by Julian J. Faraway.

Topics: We will tentatively cover the following theoretical topics: modeling and construction of random variables; study of Z, chi-square, t, and F distributions; organization of data; various descriptive statistics such as measures of variability and location; study of order statistics; statistical inference methods including estimation, understanding of hypothesis testing, determination of p-values, and confidence intervals; categorical variables;

sampling distributions (LLN and CLT); linear regression models; regression analysis; analysis of variance; the Bootstrap and jackknife methodology of computer based estimation; cluster analysis.

Grading: There will be two midterms and a final, which will account for 80% of the grade (20% for the first mid-term, 20% for the second mid-term, and 40% for the final). 20% of the grade will come from quizzes designed to test mastery of the homework. There will be one quiz per month.

Special announcement: This course may employ an online proctoring system for exams, which may require the use of a video camera.

Homework: There will be weekly/biweekly homeworks. Homeworks will be posted in Blackboard. Solutions will be posted thereafter. Homeworks will not be collected, but the exams will be from the materials covered in class and the homework problems.

Blackboard: I will be using Blackboard to disseminate homework assignments and announcements / reminders; please keep an eye on the class Blackboard page.

Cell Phones: Cell phone use is not permitted in the classroom. If you need to use one (for a personal emergency, etc.), please mute your device while using it. If there is some situation which requires you to be excused from this policy, please speak with me.

Attendance and Absences: You are expected to come to class. If you do miss class it is your responsibility to find out (from a classmate) what you missed, including class notes, announcements, and worksheets. Absences from tests will be excused only for reasons such as serious illness or official university activities. In some cases the student can obtain an excuse from a Dean. If the absence is excused, the student's grade on the missed test will be determined by a written or oral make-up exam, at my discretion.

Academic Integrity: You are expected to follow the CUNY Academic Integrity Policy. All students should be familiar with and obey the CUNY policy on academic misconduct: https://www.cuny.edu/about/administration/offices/la/Academic_Integrity_Policy.pdf Note that the following is considered cheating: i) copying a program from another student, ii) copying a program from another student and changing the variable names (or another similar procedure), iii) having an open window or printout of another student's program in front of you, while you are writing yours. Cheating will not be taken lightly.