MATH408: Mathematical Statistics, Spring 2022

Everything can change with little or no notice at any moment...

In particular, a class (lecture and/or discussion) can be moved to on-line mode on a very short notice, so please check your e-mail before every class.

Mathematical Statistics (MATH 408)
Spring 2022
Class number 39631R
(10am MWF, CPA 102)
The final exam is Monday, May 9, 8--10am

Our Math 408 in Spring 2022 semester: Key dates

- January 10: first day of classes
- January 17: MLK Day, no class
- January 28: Last day to drop without a `W' AND with refund
- February 21: Presidents' Day, no class
- February 25: Last day to drop without a `W', BUT WITH NO refund
- March 7: Midterm Exam 1

- March 11: First computer project is due
- March 13-20: Spring break
- April 8: Last day to drop with a `W'
- April 18: Midterm Exam 2
- April 22: Second computer project is due
- April 29: Experimental project is due; Last day of classes
- May 9: Final exam

Class Schedule
Homeworks and the Experimental Project
Computer Projects

- **Instructor:** Dr. Sergey Lototsky.
  Office: KAP 248 D.
  Phone: (213) 740-2389.
  E-mail: lototsky (at) usc (dot) edu.
  Lectures: MWF 10:00-10:50am, CPA 102 [The tower with the globe]
  Office hours: MWF 11:30am-12:30pm [in-person/on zoom]

Please make sure to talk to me about your problems, questions, or concerns in this class. We can always arrange a special zoom meeting.

- **Teaching Assistant:** JE Paguyo
  E-mail: paguyo (at) usc [dot] edu
  Discussions: T Th, 2:00-2:50pm in KAP 165, 3:00-3:50pm in KAP 134
  Office hours: Tuesdays, Thursdays 9-10am, Wednesdays 3-4pm

- **Textbook:**``Mathematical Statistics with Applications'' by D. Wackerly, W. Mendenhall and R. Scheaffer, published by CENGAGE Learning of Brooks/Cole. Any edition will do; I have 7th (from 2007/2008).
- **Objective:** To provide the students with the general knowledge and skills necessary to apply statistical methods to more specific areas of natural and social sciences.
- **Goal:** To understand the material in Chapters 1 and 8-16 of the book.
- **Note:** The material of Chapters 2-7 in our book is covered in MATH 407 and is a pre-req for this class [MATH 407 uses a different book, though].

There will be two one-hour exams: March 7 and April 18 (both Mondays) during regular lecture

hours. Final exam is Monday, May 9, 8-10am.

Calculators are **required** during exams and most quizzes.

Homework, Quizzes, etc.: There will be 12 weekly quizzes, 12 homeworks, two computer projects and an experimental project. You should know how to solve every homework problem and turn in each homework on the corresponding due date, but do not expect homework problems to be thoroughly graded. You are welcome to use any help with all the work other than quizzes and exams. During quizzes and exams, you are on your own, with only a writing/erazing instrument, a calculator (without internet connection or any other communication capabilities) and, if applicable, suitable tables of basic distributions. The choice of a calculator is up to you. In particular, you ar welcome to use one with advanced statistical features, so that you will not need any tables. While a precise definition of a calculator might not really exist, devices such as tablets, smart phones, and laptop computers certainly do not count as calculators and are not allowed during exams. If in doubt, please talk to me in advance about the particular calculator you plan to use.

Please keep in mind that homework assignments are minimal requirements. To succeed in the class, you need to solve more problems, from the book and/or from other sources. Keep all your notes, including scratch paper, until after you are completely done with this class.

Quizzes will take place during discussion sections, either on Tuesday or on Thursday. The exact dates are in the class schedule. Calculators are required for most quizzes. **The teaching assistant is responsible for preparing, administering, and grading quizzes and for grading the homeworks and computer assignments.**

Grading:

- Quizzes 10% total (less than 1% each)
- Homeworks 10% total (less than 1% each)
- Two One-Hour Exams, 30% total (15% each)
- Two Computer Projects, 10% total (5% each)
- Experimental Project 10%
- Final Exam 30%

Approximate Grading Scheme. A: 90 and up; B: 80-89; C: 70-79. Pluses/minuses (As in A-, B+, etc.) will mostly be decided on a case-by-case basis.

Missed work. The general rule: no make-up exams or quizzes, and no late submissions of homeworks or projects (but early submissions, especially in electronic format, are welcome). **Emergencies will be handled on a case-by-case basis.** If you miss the final exam, with a valid excuse, you get an incomplete in the class; an incomplete is a major inconvenience for a number of people, including yourself, so, please, do not miss the final.

To encourage and reward consistent performance throughout the semester, I will not automatically drop any scores (such as the two lowest quizzes, etc.)

Additional Information.

Students Requiring Special Accommodation
Any student requesting academic accommodations based on special needs is required to register with OSAS (Office of Student Accessibility Services) each semester. A letter of verification for approved accommodations can be obtained from OSAS. Please be sure the letter is delivered to me (or to TA) as early in the semester as possible. OSAS is located in GFS 120. To contact OSAS: (213) 740-0776 [tel.], SASfrntd@usc.edu [e-mail], on the web.

Academic Integrity
USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own. All students are expected to understand and abide by these principles. Scampus (the Student Guidebook) contains the Student Conduct Code in Section 11.00, while the recommended sanctions are in Appendix A.

Academic Support The Kortschak Center for Learning and Creativity

Additional Material

Previous exams
Exam 1 Spring 2015 Spring 2016 Fall 2017 Spring 2018 Fall 2020 Spring 2022 [sol]
Exam 2 Spring 2015 Spring 2016 Fall 2017 Spring 2018 Fall 2020 Spring 2022
Final Exam Spring 2015 Spring 2016 Fall 2017 Spring 2018 Fall 2020

Other materials

- **Mine**
  Lecture 1
  General summary of probability
  Summary of normal distribution and CLT
  Basic inequalities
  Convergence of random variables
  Summary of some confidence intervals
  Summary of some hypothesis testing
  A summary of linear algebra (my version, originally written for math 245)
  Summary of ANOVA

- **By other people**
  (Almost) everything you need to know about probability distributions
  Basic formulas and tables
  Four tables [can be used on all our exams]
  Two summaries of linear algebra: your choice of Four pages or Ten pages

How to write Greek letters (by Olga Korosteleva, CSULB)
Simpson's Paradox
Normal Probability Plot
More about probability plots
Quantile-Quantile plot
Non-uniquenss of MLE
A research paper about sample correlation coefficient
A research paper about variance stabilization
An essay on (recent) history of statistics
A survey paper about conjugate priors

Part of this is performed by a (then, future, now, former) math 408 student

More

- Why do we need a note taker? A variation
- What makes an expert?
- No optional material

Southern California Chapter of the American Statistical Association (SCASA)

Minor in Statistics at USC

USC Math Department Homepage