Midterm Exam Coverage: Chapter 2, 3, 16, 17, 8

Background: Probability, Multivariate Normal, Multivariate t, combination of both (Copula), Expectation, Variance, Constrained Optimization, Change of Variables, Matrix Algebra, Eigenvectors, Regression, Log-Normal Distribution (Y= lnX ~ N(mu, sigma^2))

STAT GR5261/GU4261 STATISTICAL METHODS FOR FINANCE

SPRING 2023

Friday 10:10am-12:40pm Location: 309 Havemeyer Hall

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Teaching Assistant: Richard Groenewald

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Office hours: TBA.

Prerequisites: Familiarity with probability theory and statistical inference and linear regression, some knowledge of multivariate analysis and some matrix algebra.

Grading: Your final grade will be based on one in class exams, take home assignments (HWs) and a final project. Homework will be assigned every week and collected a week later. Late assignments will not be accepted and they will result automatically in a zero but the lowest score on the homework assignments will be dropped. The exam will count for 40% of the final grade. The Hws and the final project will each count for 30% of the final grade .

Textbook (required):
Statistics and Data Analysis for Financial Engineering with R examples by Ruppert, David, Matteson. New York: Springer.

Reference books (optional):
Statistical Models and Methods for Financial Markets by T.L. Lai and H. Xing, New York: Springer.
Statistics and Finance: An Introduction by David Ruppert, New York, Springer

Outline of the course (the material will not be covered in this order)

1. Chapter 1: Introduction
2. Chapter 2: Returns
3. Chapter 3: Fixed Income
4. Chapter 4: Exploratory Data Analysis
5. Chapters 5: Modeling Univariate Distributions
6. Chapter 6: Resampling
7. Chapter 7: Multivariate Statistical Models
8. Chapter 8: Copulas
9. Chapter:16: Portfolio Selection
10. Chapter 9 & 17 : Regression: Basics and The Capital Asset Pricing Model

Project: (Vague guideline for now) Summary, Introduction, Data Analysis, Conclusion

11. Chapter 18: Factor Model and Principal Component Analysis
12. Chapters 19: Risk Management

Academic honesty: Academic dishonesty is unacceptable and will not be tolerated. Cheating, forgery, plagiarism and collusion in dishonest acts undermine Columbia's educational mission and the students' personal and intellectual growth. Columbia students are expected to bear individual responsibility for their work, to learn the rules and definitions that underlie the practice of academic integrity, and to uphold its ideals. Ignorance of the rules is not an acceptable excuse for disobeying them. Any student who attempts to compromise or devalue the academic process will be sanctioned.