

**Statistical Methods in Quantitative Finance**  
MAFS5140

Instructor & T.A.

- Instructor: Kani Chen. Email: makchen@ust.hk; Phone: 2358-7425; Office: Room 3426. Office hour: Walk-in or by appointment.
- TA:

Textbook & Reference Books.

- Lecture Notes: To be posted every two weeks.
- Textbook 1 (LX): Statistical Models and Methods for Financial Markets. (Springer 2008, ISBN978038777826, eISBN: 978038777823) by T.L Lai and H. Xing;  
Book website: <http://www.stanford.edu/~xing/statfinbook/index.html>
- Textbook 2 (RU): Statistics and Data Analysis for Financial Engineering. (Springer 2011, ISBN9781441977878, eISBN9781441977878) by D. Ruppert. Book website: <https://people.orie.cornell.edu/davidr/SDAFE/>
- Reference books:
  1. Statistical Analysis of Financial Data in S-plus. (Springer-Verlag 2003) by Carmona, R. A.
  2. Modern Applied Statistics with S. (Springer-Verlag 2002) by Venables, W.N. and Ripley, B.D.

Intended Learning Outcomes:

- Students will understand basic statistical/quantitative tools to apply to financial data analysis. Exploratory data analysis, linear and nonlinear models, factor analysis and Bayesian statistics are among the statistical topics, and portfolio theory, capital asset pricing model and risk management are among the finance topics to be covered in this course. Students will practice R coding and apply them to real data analysis.

Grading and Exams:

- Midterm Exam: 25%; Projects (Practical Performance and Intellectual Merits): 50%; Final Report (Overall Summary): 25%.

Tentative Schedules.

- Wk 1. Chapter 1. Introduction and exploratory data analysis. (RU: Chap 4 )
- Wk 2-3. Chapter 2. Linear regression models (RU: Chapter 12-14; LX: Chap 1 )
- Wk 4-5. Chapter 3. Factor models and PCA (RU: Chap 17; LX: Chap 2)
- Wk 6. Chapter 4. Portfolio theory. (RU: Chap 11 and LX: Chap 3)
- Wk 7. Chapter 5. Statistical analysis of capital asset pricing models. (RU: Chap 16 and LX: Chap 3)
- \* Midterm exam *tentatively* on Week 8.
- Wk 8-9. Chapter 6. Parametric models and Bayesian methods. (RU: Chap 10 and LX: Chap 4)

- Wk 10-11. Chapter 7. Nonparametric methods. (RU: Chap 11 and LX: Chap 7)
- Wk 12. Chapter 8. Statistical methods in risk management (RU: Chap 19 and LX: Chap 12)
- Wk 13. Chapter 9. Miscellaneous topics. (if time allows.)
- Remark: The above course schedule may be subject to minor changes depending upon the teaching progress.