COURSE CONTENT FOR MH4519

Academic Year	2023/24	**Semester**	2
Course Coordinator	Hong, Seok Young (Asst Prof)		
Course Code	MH4519		
Course Title	Financial Econometrics		
Pre-requisites	MH2500 Probability & Introduction to Statistics OR MH1820 Introduction to Probability & Statistical Methods		
Mutually Exclusive	None		
No of AUs	4 AU		
Contact Hours	Lecture: 39 hours; Tutorial: 12 hours		
Proposal Date	11 September 2023		

Course Aims

This course provides an introduction to financial econometrics, which refers to the application of statistical tools in finance. With your prior background in basic probability and statistics, you will learn various econometric methods used in analysing and modelling financial data.

Intended Learning Outcomes (ILO)

Upon the successful completion of this course, you (as a student) would be able to:

1. Describe the stylised facts of asset prices and returns
2. Make use of modern econometric tools for modelling financial data
3. Conduct volatility modelling for financial investment decisions
4. Use statistical software packages for econometric analysis

Course Content

This course will cover the following topics:

1. Financial Econometrics: An Introduction
2. Basics of Probability Theory
3. Basics of Statistical Inference
4. Linear Time Series Models
5. Return Predictability
6. Volatility
7. Multivariate Time Series Models
8. Factor Models and PCA
9. High-Frequency Financial Econometrics
10. Market Microstructure
11. Nonparametric and Nonlinear Methods

Assessment (includes both continuous and summative assessment)

Component	ILO Tested	Weighting	Team/Individual	Assessment Rubrics
Final Examination	1, 2, 3, 4	60%	Individual	Point-based marking (not rubrics based)

Assignment	1, 2, 3, 4	10%	Individual	Point-based marking (not rubrics based)
Mid-term test	1, 2, 4	30%	Individual	Point-based marking (not rubrics based)
Total		100%		

Formative feedback

Solution sheets will be provided for the mid-term test and the coursework (assignment).
You will also be given detailed answers for the questions covered in tutorial sessions every week.

Learning and Teaching approach

Approach	**How does this approach support students in achieving the learning outcomes?**
Lectures (39 hours)	Explain the core idea and principles of the course contents and motivate students. Present some important econometric tools developed and used in modern financial econometrics. Derive mathematical details and proofs for the theorems taught.
Tutorials (12 hours)	Reiterate some key messages given in lectures. Provide students with the opportunity to practice problem solving skills and ask questions.

Reading and References

- Linton, Oliver (2017). *Probability, Statistics and Econometrics*, Academic Press (ISBN: 9780128104958)
- Taylor, Stephen (2005). Asset Price Dynamics, Volatility and Prediction, Princeton University Press (ISBN: 0-691-11537-0)
- Tsay, Ruey (2010). Analysis of Financial Time Series, Wiley (ISBN: 9780470414354)

Course Policies and Student Responsibilities

Students are strongly advised to attend all lecture and tutorial sessions. They are required to complete the assignment by the due date given by the instructor and take the mid-term test & final examination on the dates announced beforehand.

There will be penalties for late submissions of your assignment: 30% deduction for late submissions up to 3 hours, 70% deduction for late submissions up to 1 day, and 100% deduction for late submissions more than 1 day.

If a student misses a test, a mark of zero will be given unless prior permission is given by the course instructor, or a leave of absence is approved by the School. In case of a missed test, the student must inform the instructor via email within 3 days of the test.

If you are sick and unable to attend a mid-term test or missed the deadlines for your coursework (assignment), you must 1. Inform the instructor via email AND 2. Submit the medical certificate issued by a medical practitioner registered with the Singapore Medical Association to your school administrator, not later than 7 working days after the medical leave. In this case, the missed assessment component will not be counted towards your final grade. There will be no make-up mid-term test or make-up assignment.

Academic Integrity

Good academic work depends on honesty and ethical behaviour. The quality of your work as a student relies on adhering to the principles of academic integrity and to the NTU Honour Code, a set of values shared by the whole university community. Truth, Trust and Justice are at the core of NTU's shared values.

As a student, it is important that you recognize your responsibilities in understanding and applying the principles of academic integrity in all the work you do at NTU. Not knowing what is involved in maintaining academic integrity does not excuse academic dishonesty. You need to actively equip yourself with strategies to avoid all forms of academic dishonesty, including plagiarism, academic fraud, collusion and cheating. If you are uncertain of the definitions of any of these terms, you should go to the academic integrity website for more information.

On the use of technological tools (such as Generative AI tools), different courses / assignments have different intended learning outcomes. Students should refer to the specific assignment instructions on their use and requirements and/or consult your instructors on how you can use these tools to help your learning.

Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.

Course Instructors

Instructor	Office Location	Phone	Email
Hong, Seok Young	SHHK-04-59	69047115	seokyoung.hong@ntu.edu.sg

Planned Weekly Schedule

Week	Topics (Refer to the above listed lecture)	Course ILO	Readings/ Activities
1	Financial Econometrics: An Introduction	1, 2, 4	Taylor (2005), Chapters 1, 2, 4; Tsay (2010), Chapter 1
2	Basics of Probability Theory	2, 4	Linton (2017), Chapters 1 – 8
3	Basics of Statistical Inference	2, 4	Linton (2017), Chapters 10 – 13

4	Linear Time Series Models	2, 4	Taylor (2005), Chapter 3 Tsay (2010), Chapter 2
5	Return Predictability I	2, 4	Taylor (2005), Chapters 5, 6, 7
6	Return Predictability II	2, 4	Taylor (2005), Chapters 5, 6, 7
7	Mid-Term Test / Volatility I	2, 3, 4	Mid-Term Test / Tsay (2010), Chapter 3; Taylor (2005), Chapters 8, 9, 10, 11
8	Volatility II	2, 3, 4	Tsay (2010), Chapter 10; Taylor (2005), Chapters 8, 9, 10, 11
9	Multivariate Time Series Models	2, 4	Tsay (2010), Chapter 8
10	Factor Models and PCA	2, 3, 4	Tsay (2010), Chapter 9
11	High-Frequency Financial Econometrics	1, 2, 3, 4	Taylor (2005), Chapter 12; Tsay (2010), Chapter 5
12	Market Microstructure	1, 2, 3, 4	Tsay (2010), Chapter 5
13	Nonparametric and Nonlinear Methods	2, 3, 4	Tsay (2010), Chapter 4

The above schedule is for illustrative purposes and is subject to the exigencies of the calendar.

NB. Mid-Term Test will be conducted at the beginning of Lecture 7