City University of Hong Kong
Course Syllabus

offered by Department of Economics and Finance
with effect from Semester A 2023/24

Part I Course Overview

Course Title:	Financial Econometrics
Course Code:	EF5070
Course Duration:	1 semester
Credit Units:	3
Level:	P5
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites: *(Course Code and Title)*	Nil
Precursors: *(Course Code and Title)*	Nil
Equivalent Courses: *(Course Code and Title)*	Nil
Exclusive Courses: *(Course Code and Title)*	Nil

Part II Course Details

1. Abstract

This course aims to equip students with financial econometric methods to analyse time series in the respect of risk and return, and volatility modelling and risk management. Students are expected to gain practical experience in analysing financial and macroeconomic data.

2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs	Weighting (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	*A2*	*A3*
1.	Apply econometric methods to analyse financial time series	-	√	√	√
2.	Implement econometric models to solve risk management problems	-		√	√
3.	Analyse portfolio risk through various volatility models	-		√	√
		-			

A1: *Attitude*
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: *Ability*
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to self-life problems.

A3: *Accomplishments*
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

3. Teaching and Learning Activities (TLAs)

(TLAs designed to facilitate students' achievement of the CILOs.)

TLA	Brief Description	CILO No.			Hours/week (if applicable)
		1	2	3	
1.	Lectures on (1) A terse instruction to the R program; (2) Review of probability and statistics; (3) Linear Time Series Analysis, Nonlinear Models, High-Frequency Data Analysis and their applications, etc.	√	√	√	3 hours/week
2.	Assignments (4-5 individual problem sets)	√	√	√	

4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.			Weighting	Remarks
	1	2	3		
Continuous Assessment: 60 %					
Assignments (4-5 individual problem sets) Assignments on basic statistics and R programming, and on the application of R to financial time series analysis, demonstrating students' ability to model linear time series models, evaluate model adequacy, build time-varying conditional models, and detect structural changes in the mean and variance processes etc.	√	√	√	60%	
Examination: 40% (duration: 2 hours , if applicable)					
Examination One final examination on concepts and analytics of financial time series, and on R programming examples of financial time series analysis, demonstrating students' ability to model linear time series models, evaluate model adequacy, build time-varying conditional models, and detect structural changes in the mean and variance processes etc.	√	√	√	40%	
				100%	

5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Applicable to students admitted in Semester A 2022/23 and thereafter

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B)	Marginal (B-, C+, C)	Failure (F)
Assignments (4-5 individual problem sets)	Analytical and programming skills	Demonstrate very strong knowledge in the subject, and a superior grasp of the critical issue and techniques, which include the ability to model linear time series models, evaluate model adequacy, build time-varying conditional models, and detect structural changes in the mean and variance processes etc. Also, students will explore high-frequency analysis and explore the microstructure noise issue in financial analysis.	Demonstrate good knowledge in the subject, and a good grasp of the critical issue and techniques, which include the ability to model linear time series models, evaluate model adequacy, build time-varying conditional models, and detect structural changes in the mean and variance processes etc. Also, students will explore high-frequency analysis and explore the microstructure noise issue in financial analysis.	Demonstrate limited knowledge in the subject, and some idea of the critical issue and techniques, which include the ability to model linear time series models, evaluate model adequacy, build time-varying conditional models, and detect structural changes in the mean and variance processes etc. Also, students will explore high-frequency analysis and explore the microstructure noise issue in financial analysis.	Demonstrate very little knowledge in the subject, and no awareness of the critical issue and techniques, which include the ability to model linear time series models, evaluate model adequacy, build time-varying conditional models, and detect structural changes in the mean and variance processes etc. Also, students will explore high-frequency analysis and explore the microstructure noise issue in financial analysis.
Examination	Analytical skills and knowledge about programming	Demonstrate very strong knowledge in the subject, and a superior grasp of the critical issue and techniques, which include the ability to model linear time series models, evaluate model adequacy, build time-varying conditional models, and detect structural changes in the mean and variance processes etc. Also, students will explore	Demonstrate good knowledge in the subject, and a good grasp of the critical issue and techniques, which include the ability to model linear time series models, evaluate model adequacy, build time-varying conditional models, and detect structural changes in the mean and variance processes etc. Also, students will explore	Demonstrate limited knowledge in the subject, and some idea of the critical issue and techniques, which include the ability to model linear time series models, evaluate model adequacy, build time-varying conditional models, and detect structural changes in the mean and variance processes etc. Also, students will explore high-frequency analysis and explore the microstructure noise issue in financial	Demonstrate very little knowledge in the subject, and no awareness of the critical issue and techniques, which include the ability to model linear time series models, evaluate model adequacy, build time-varying conditional models, and detect structural changes in the mean and variance processes etc. Also, students will explore high-frequency analysis and explore the

		high-frequency analysis and explore the microstructure noise issue in financial analysis.	high-frequency analysis and explore the microstructure noise issue in financial analysis.	analysis.	microstructure noise issue in financial analysis.

Applicable to students admitted before Semester A 2022/23

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
Assignments (4-5 individual problem sets)	Analytical and programming skills	Demonstrate very strong knowledge in the subject, and a superior grasp of the critical issue and techniques, which include the ability to model linear time series models, evaluate model adequacy, build time-varying conditional models, and detect structural changes in the mean and variance processes etc. Also, students will explore high-frequency analysis and explore the microstructure noise issue in financial analysis.	Demonstrate good knowledge in the subject, and a good grasp of the critical issue and techniques, which include the ability to model linear time series models, evaluate model adequacy, build time-varying conditional models, and detect structural changes in the mean and variance processes etc. Also, students will explore high-frequency analysis and explore the microstructure noise issue in financial analysis.	Demonstrate adequate knowledge in the subject, and adequate grasp of the critical issue and techniques, which include the ability to model linear time series models, evaluate model adequacy, build time-varying conditional models, and detect structural changes in the mean and variance processes etc. Also, students will explore high-frequency analysis and explore the microstructure noise issue in financial analysis.	Demonstrate limited knowledge in the subject, and some idea of the critical issue and techniques, which include the ability to model linear time series models, evaluate model adequacy, build time-varying conditional models, and detect structural changes in the mean and variance processes etc. Also, students will explore high-frequency analysis and explore the microstructure noise issue in financial analysis.	Demonstrate very little knowledge in the subject, and no awareness of the critical issue and techniques, which include the ability to model linear time series models, evaluate model adequacy, build time-varying conditional models, and detect structural changes in the mean and variance processes etc. Also, students will explore high-frequency analysis and explore the microstructure noise issue in financial analysis.
Examination	Analytical skills and knowledge about programming	Demonstrate very strong knowledge in the subject, and a superior grasp of the critical issue and techniques, which	Demonstrate good knowledge in the subject, and a good grasp of the critical issue and techniques, which include the	Demonstrate adequate knowledge in the subject, and adequate grasp of the critical issue and techniques, which	Demonstrate limited knowledge in the subject, and some idea of the critical issue and techniques, which include the	Demonstrate very little knowledge in the subject, and no awareness of the critical issue and techniques, which

		include the ability to model linear time series models, evaluate model adequacy, build time-varying conditional models, and detect structural changes in the mean and variance processes etc. Also, students will explore high-frequency analysis and explore the microstructure noise issue in financial analysis.	ability to model linear time series models, evaluate model adequacy, build time-varying conditional models, and detect structural changes in the mean and variance processes etc. Also, students will explore high-frequency analysis and explore the microstructure noise issue in financial analysis.	include the ability to model linear time series models, evaluate model adequacy, build time-varying conditional models, and detect structural changes in the mean and variance processes etc. Also, students will explore high-frequency analysis and explore the microstructure noise issue in financial analysis.	ability to model linear time series models, evaluate model adequacy, build time-varying conditional models, and detect structural changes in the mean and variance processes etc. Also, students will explore high-frequency analysis and explore the microstructure noise issue in financial analysis.	include the ability to model linear time series models, evaluate model adequacy, build time-varying conditional models, and detect structural changes in the mean and variance processes etc. Also, students will explore high-frequency analysis and explore the microstructure noise issue in financial analysis.

Part III Other Information (more details can be provided separately in the teaching plan)

1. Keyword Syllabus

Financial Time Series Analysis and its Application
Volatility Models (ARCH, GARCH, EWMA, and Risk Metrics Models)
Market and Credit Risk
VaR

2. Reading List

2.1 Compulsory Readings

(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

1.	Ruey S. Tsay, Analysis of Financial Time Series, John Wiley & Sons, New Jersey, 2005

2.2 Additional Readings

(Additional references for students to learn to expand their knowledge about the subject.)

Nil