Master of Science in Quantitative Finance Class of 2018

COURSE CODE: **QF603**
COURSE TITLE: **Quantitative Analysis of Financial Markets**

Instructor : Dr Christopher Ting
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PRE-REQUISITE/CO-REQUISITE/MUTUALLY EXCLUSIVE COURSE(S)
None

COURSE AREA
M.Sc in Quantitative Finance Core

GRADING BASIS
Graded

COURSE UNIT
1 CU

FIRST OFFERING TERM
Academic Year: AY2018
Academic Term: 2

COURSE DESCRIPTION
Many quantitative hedge funds and proprietary trading shops seek to generate alpha consistently by developing new and better trading strategies. The research and development of new strategies invariably involves the analysis of an enormous amount of financial and economic data of various types. By examining these data from the alpha-seeking perspective, this course aims to build a strong foundation for students to grasp the significance and implications of events in the financial markets.

The topics covered in this course include the relevant econometric and statistical procedures such as the chi-square test. Students will study these procedural algorithms in detail through hands-on programming. The computing skills and quantitative finance insights gained from this course will not only raise their analytical competency but also deepen their intuitive understanding of the financial markets around the world.

This course pays special attention to the assumptions underlying the financial, economic, and econometric models. After all, as George Box puts it, “All models are wrong, but some models are useful.” Exposing the fallacies of some well-known models, the course will help students to hone their critical thinking skills, to develop a keen eye for pitfalls, and to apply the models with a pinch of salt when solving the real-world problems of Quantitative Finance.

This course also prepares students for taking the Quantitative Analysis (QA) area in FRM.

LEARNING OBJECTIVES

By the end of this course, students will be able to define, discuss, elaborate, and evaluate

- Discrete and continuous probability distributions
- Estimating the parameters of distributions
- Population and sample statistics
- Bayesian analysis
- Statistical inference and hypothesis testing
- Estimating correlation and volatility using EWMA and GARCH models
- Volatility term structures
- Correlations and copulas
- Linear regression with single and multiple regressors
- Time series analysis and forecasting

ASSESSMENT METHODS

Basis of Assessment

Class participation	10%
Homework Assignments	25%
Group mini project	15%
Final Exam	50%
Total	100%

ACADEMIC INTEGRITY

All acts of academic dishonesty (including, but not limited to, plagiarism, cheating, fabrication, facilitation of acts of academic dishonesty by others, unauthorized possession of exam questions, or tampering with the academic work of other students) are serious offences.

All work presented in class must be the student's own work. Any student caught violating this policy may result in the student receiving zero marks for the component assessment or a fail grade for the course. This policy applies to all works (whether oral or written) submitted for purposes of assessment.

When in doubt, students are encouraged to consult the instructors of the course. Details on the SMU Code of Academic Integrity may be accessed at http://www.smuscd.org/resources.html.

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RECOMMENDED TEXT

(1) Class Notes by Christopher Ting (2018)

(2) Mathematics and Statistics for Financial Risk Management by Michael Miller, John Wiley & Sons (2012)

(3) Introductory Econometrics for Finance 3nd edition by Chris Brooks, Cambridge University Press (2014)

(4) Options, Futures, and Other Derivatives, 8th Edition by John Hull, Pearson Prentice Hall, (2012)

TENTATIVE SCHEDULE

Session No.	Topic	Readings (Chapter Nos.)
1	FRM QA-1 to QA-3 **Probabilities, Basic Statistics, Distributions**	Chapters 2 to 4 of **(2)**
2	FRM QA-4 and QA-5 **Bayesian Analysis,** **Hypothesis Testing and Confidence Intervals**	Chapters 6 and 7 of **(2)**
3	FRM QA-6 and QA-7 **Linear Regression with One Regressor,** **Regression with a Single Regressor**	Chapter 3 of (3)
4	FRM QA-8 to QA-9 **Linear Regression with Multiple Regressors,** **Hypothesis Tests and Confidence Intervals in Multiple Regression**	Chapter 4 of (3)
5	Classical linear regression model assumptions and diagnostic tests	Chapter 5 of (3)
6	FRM QA-10 to QA-12 **Modeling and Forecasting Trend,** **Modeling and Forecasting Seasonality** **Characterizing Cycles**	(1)
7	FRM QA-13 to QA-14 **Modeling Cycles: MA, AR, and ARMA Models,** **GARCH**	Chapters 10 of (4)
8	Catch-up and review	(1)

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