DSC5211C QUANTITATIVE RISK MANAGEMENT

AY2015-2016 Semester 2

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Course Description

The aim of this course is to provide an introduction to the probability and statistical methods to model market, credit and operational risk. Topics addressed include loss distributions, multivariate models, dependence and copulas, extreme value theory, risk measures, risk aggregation and risk allocation.

Learning Outcomes

- Learn the general concept of risk and risk management. Understand different sources of risk faced.
- Acquire quantitative tools for measuring risk and know how to apply these techniques.
- Understand the framework of Value-at-Risk (VaR). Understand the pros and cons of different VaR estimation methods.
- Know how to do back testing for VaR using historical data. Understand the limitation and flaws of VaR.

Topics

- Risk in perspective
- Basic concepts in risk management
- Multivariate models
- Financial time series
- Copulas and dependency
- Aggregate risk
- Extreme value theory
- Credit risk management

Readings

Required

- John C. Hull: Risk Management and Financial Institutions (4th edition), Wiley, 2015

Recommended

- AJ McNeil, R Frey and P Embrechts (MFE): Quantitative Risk Management: Concepts, Techniques and Tools, Princeton University Press, Princeton, 2005

Prerequisites

DSC4213 Analytical Tools for Consulting, or prior knowledge in analytical tools

Projects

There are 3 group projects. Each group has 3 - 5 students. There is also one in-class individual project.

Assessment

Component	**Weight**
In-class project	40%
Group projects	40%
Homework	20%
Total	**100%**

Exception participation gives up to 5% to the final grading.

Tentative Schedule

Week	**Topic**	**Chapters (Hull)**
1	Introduction	1
2	Financial institutions	2, 3, 4
3	Trading, credit crisis of 2007	5, 6
4	Valuation and scenario analysis	7
5	Managing trading risks, interest rate risks	8, 9
6	Volatility	10
7	Correlation and copulas	11
8	Value at Risk	12
9	Historical simulation and extreme value theory	13
10	Model-building approach	14
11	Banking regulation	15-17
12	Credit risk	18-21
13	In-class project	