FIN311 Mathematics and Programming for Finance

Level: 3

Credit Units: 5 Credit Units

Language: ENGLISH

Presentation Pattern: EVERY SEMESTER

Synopsis:

A finance graduate will not only be challenged with the analysis and interpretation of immense amounts of financial data and appreciation of financial information, he/she will also be requested to make sense of mathematical models used in both academic and industrial settings
in the areas of risk management as well as trading and investment analyses. FinTech adds a further dimension to the current new requirements.

FIN311 Mathematics and Programming for Finance aims to equip the finance graduates with suitable mathematical and programming skills to measure data, to read, understand, apply and implement models, so as to provide solutions to problems that arise from both traditional
finance as well as FinTech.

Topics:

- Data and Measurements
- Data Patterns and Modality
- Statistical Models
- Game Theoretic Models
- Programming with Python
- Programming with R
- Data Structures
- Analysis of Complexity of Algorithms
- Symmetric and Asymmetric Cryptography
- Digital Signatures and Hash Functions
- Achieving Consensus on Blockchains
- Blockchain Stability under Attacks

Textbooks:

Yves Hilpisch: Python for Finance (2nd Edition), Mastering Data - Driven Finance/ Yves Hilpisch, 2018 2 O'Reilly Media
ISBN-13: 9781492024330

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ISBN-13: 9781492024330-AA

Learning Outcome:

- Formulate models to understand complex reality in the abstract data.
- Compute with models either to calibrate them to data or to draw conclusions from them.
- Develop computer programs to implement the models.
- Design data structures to extract and store information for applications.
- Analyse the efficiency and complexity of data structures.
- Examine the privacy and authenticity of data in cryptographic protocols.
- Compute with random and hash functions and understand their significance in applications.
- Analyse interactions on blockchains in game theory settings.
- Calculate probabilities, utilities and other values in cryptocurrency systems and appreciate their security significance.
- Use a computing tool (e.g. Excel/Google Spreadsheets, Python, R) for financial calculations.
- Use a financial information system (e.g. Reuters Eikon or the Internet) for obtaining market data and information, and inferencing well-documented API/library/models.
- Analyse data that arise from cryptocurrency systems.

Continuous Assessment Component	**Weightage (%)**
PRE-COURSE QUIZ	2
PRE-COURSE QUIZ	2
PRE-COURSE QUIZ	2
TUTOR-MARKED ASSIGNMENT	38
PARTICIPATION	6
Sub-Total	**50**

Examinable Component	**Weightage (%)**
Written Exam	50
Sub-Total	**50**

Weightage Total	**100**