HSBC

HSBC Quant Academy

Preliminary curriculum of the course

Jagiellonian University, Faculty of Mathematics and Computer Science

25 September 2024

This course introduces students to the reality of financial services in general and banking in particular, work on (near) real data, build models, understand products and business models of the financial sector, as well understand the basics of risk management.

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1. Summary of key information

- Target audience: students in 4th or 5th year Financial Mathematics
- Number of hours: 30 hours lectures and 30 hours workshops
- The course will be delivered in English.
- Students will get HSBC Quants Academy course completion certificate once completing the course: HSBC's certificate / diploma to confirm that they have completed the course at UJ, led by HSBC.

2. Course Coordinators

- Philippe De Brouwer, Ph.D. (Tel: +48 790 715 002)
- Marcin Pitera, Ph. D.

3. Students' evaluation

Open computer exam / or projects to be delivered at the end of the course. The exam consists of presenting a project of choice (using data to build a basic model), presenting and defending it. The project is groupwork.

4. Agenda

Subject	lecturer	date
PART I: Introduction to Banking and Risk		
introduction + HSBC + jobs + CVs	Philippe De Brouwer	07/10/2024
Banking / financial services organizations	Philippe De Brouwer	14/10/2024
Risk Management and risk types	Philippe De Brouwer	21/10/2024
loss distributions and risk metrics	Jorge Rosales	28/10/2024
PART II: Market Risk		
Coherent Risk Measures	Philippe De Brouwer	04/11/2024
FRTB	Renato Barros	18/11/2024
PART III: Credit Risk		
Introduction to Credit Risk & the modelling framework	Piotr Kobus	25/11/2024
Risk-Based Pricing	Roman Ivanov	02/12/2024
Regression techniques and scorecards in credit risk modelling	Sattwik Das, Michal Kusy	09/12/2024
PART IV: AI		
Machine Learning from the Perspective of an Econometrician	Marcin Jaskowski	16/12/2024
PART V: Counterparty Credit Risk		
Introduction to CCR + XVA	Eray Ferah	20/01/2025
Introduction to ST + PVA	Artur Zajac	13/01/2025
PART VI: Concluding remarks & Exam		
Student's presentations & exam + starting in in a private company	volunteers	27/01/2025

Note: The exact timing and subjects can be changed without notice.

5. The Exam Requirements

Elements contributing to grade:

1. Presence in the classroom
2. Activeness of participation in the classroom
3. The assignment (groupwork – briefing follows)
    a. A paper – between 5 and 50 pages
    b. A presentation – life in the last session: "elevator pitch" of 10 minutes + 10 minutes question and answer
    c. Grading of the assignment:
        i. 40% for the idea, logic, coherence, reasoning and conclusions
        ii. 30% for the paper (buildup as scientific paper)
        iii. 30% for the presentation (quality of slides, presentation skills)

6. Literature

Slides, papers, and handouts will be uploaded to the Pegaz platform. Additionally, the students might consider:

- Wilmott P., Paul Wilmott on Quantitative Finance 3 Volume Set, 2nd edition, Wiley, 2006 2.
- Derman E., Miller M.B., Park D., The Volatility Smile, Wiley, 2016 3.
- Lewis A.L., Option Valuation Under Stochastic Volatility: With Mathematica Code, Finance Press, 2000 4. „Advances in Financial Machine Learning",
- Marcos Lopez de Prado, Wiley 5. "Time Series Analysis",
- James D. Hamilton, Princeton University Press 6. "Forecasting the term structure of government bond yields",
- Francis X. Diebold and Canlin Li, 2005, Journal of Econometrics 7.
- Francis Diebold, "No Hesitations" - Blog on Econometrics
- Fumio Hayashi (2001), "Econometrics", Princeton University Press 9. BASEL COORDINATION COMMITTEE (BCC) BULLETIN, BCC 14-1, June 30, 2014, SUBJECT: Supervisory Guidance for Data, Modeling, and Model Risk Management Under the Operational Risk Advanced Measurement Approaches https://www.federalreserve.gov/bankinforeg/basel/files/bcc1401.pdf
- RTS on AMA (Advanced Measurement Approaches) for operational risk http://ec.europa.eu/info/law/better-regulation/initiatives/c-2018-1446_en
- OpVaR: Modeling Operational (Value-at-)Risk in R, https://cran.rproject.org/web/packages/OpVaR/vignettes/OpVaR_vignette.html
- Philippe J.S. De Brouwer, The big R-Book: from data science to learning machines and big data, Wiley, 2020.