Duisenberg Honours Programme Quantitative Risk Management

Core Courses

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**Core Courses:**
- Asset Pricing: Dr. Zwinkels
- Derivatives: Dr. Seeger
- Research project: Dr. Tumer-Alkan
- Institutional Investments and ALM: Dr. Boes
- Financial Ethics: Prof. Rijken
- Financial Sector Regulation: t.b.a.
- MSc thesis: 1 Apr. – 1 Jul.
- Quantitative Financial Risk Management: Dr. Borovkova, Dr. v. Haastrecht

**Example electives**
(for other restricted electives, see the study guide, including math electives; send your draft curriculum to dr. Borovkova)

- Advanced Corporate Finance: Prof. Rijken
- Valuation and Corporate Governance: Dr. Millone
- Behavioral Corporate Finance: Dr. van den Assem
- Bank Management: Prof. Boonstra
- Real Estate Management: Dr. Hamelink, Prof. Rouwendal
- Quantitative Financial Risk Management: Dr. Borovkova, Dr. v. Haastrecht

**Finance/quant electives:** 12

**Total:** 84 ects

**Key persons**
- Program coordinator: Dr. S.A. Borovkova
- Secretary: Ms. D. Tielman
- Program director: Prof. A. Lucas

**Further information**
- MSc Q Finance at the VU & Study guide 2014-2015
This course aims to achieve advanced knowledge in theory and practice of corporate finance: understanding theoretical concepts (their strengths and limitations) and application of these theoretical frameworks in solving practical cases.

After following this course, you
1. understand basic Corporate Finance concepts, including their strengths and limitations and interrelationship with each other
2. have quantitative skills to apply these basic concepts and
3. have the skills to apply the concepts in real life cases.

This course has a strong focus on concepts about financing a company.

Prof. dr. ir. H.A. Rijken

The objective of this course is to gain insight in economic time series modelling with a focus on theory, methods and computations. The course focuses on the advances of theory and computational methods for time series econometrics. A methodology of econometric programming is explored for a number of selected topics in time series analysis. In particular, time series properties in time and frequency domains, different modeling strategies, likelihood evaluations, filtering methods and Monte Carlo simulation methods are studied. Theory and methods are studied thoroughly while some computer programs need to be developed for the implementation of the methods.

Prof. dr. S.J. Koopman

Asset Pricing is a core course of the MSc Finance. This course aims to deepen your knowledge in the field of asset pricing and asset allocation. After completion of the course, you should:

• Have a thorough understanding of how security prices are determined in financial markets, including equity and fixed income.
• Understand and be able to apply optimal asset allocations for both individual and institutional investors.
• Apply and analyze competing techniques in investment problems.

Dr. R.C.J. Zwinkels

Dr. Zwinkels is associate professor of finance. He recently joined the VU after working at Erasmus University, Radboud University, and KU Leuven. His main research interests include behavioral finance, with a focus on behavioral investments. He has published in a broad range of journals including *European Economic Review, Journal of Economic Dynamics and Control, Journal of Empirical Finance, Journal of International Money and Finance*, and *Quantitative Finance*. 
This course deals with two important aspects of bank management: the bank business model and business process management within a bank.

The first part of the course deals with management of (financial) risk and return. Managing financial risk at both the asset and liability side is key for banks and has to be aligned with the new Basel III rules. The current credit crisis shows the impact of overlooking and underestimating financial risks. Improving a banking business model can be seen as an optimisation of a banking portfolio - having various product-market combinations - in terms of (financial) risk and return.

Second, from a business process management perspective the organisation of a bank is studied. Crucial business (finance) processes are financial administration, internal audit and compliance. Organizational issues, HRM issues and ICT need all to be addressed for a true understanding of the bank's organisation. In this sense this course is a multidisciplinary course.

Prof. dr. W. Boonstra

Professor Boonstra is head of the economic research division and chief economist of Rabobank Netherlands. He is also professor of monetary economics at VU. He has published widely on many topics, including European integration, banking, international financial stability, and monetary economics.
Corporate finance courses and textbooks mostly tell us how we *should* make financial decisions. This course asks how we actually *do* make financial decisions, using insights from psychology, behavioral economics, and behavioral finance. It repeatedly contrasts decision making behavior with rational norms and explains why people deviate systematically from these norms. Understanding your own decision processes and those of others is fundamental to virtually every aspect of corporate finance, including valuation, capital budgeting, corporate governance, financing issues, dividend policy, and risk management.

**Dr. M.J. van den Assem**
Dr. Van den Assem an Associate Professor of Finance. His range of research interests particularly includes themes from the fields of financial and behavioral economics. Most of his work is empirical, focused at individual choice, and based on non-standard data. His work has been published in various renowned journals, including the *American Economic Review*, the *Review of Economics and Statistics*, *Experimental Economics*, and *Management Science*. His paper on the TV game show Deal or No Deal (or “Miljoenenjacht”) is among the most frequently downloaded manuscripts all-time in the social sciences (ssrn.com).
DERIVATIVES

The primary objective of this course is to provide students with an advanced introduction to derivative instruments. By the end of the course students have a sound understanding of pricing concepts and hedging concepts using discrete and continuous-time option pricing models with a focus on equity derivatives. Students will learn about stochastic calculus (the mathy part of the course) as well as techniques that foster practical applicability of derivatives such as how to estimate model parameters and using numerical pricing methods. The course is an entry requirement for the course Institutional Investments and ALM.

Dr. N.J. Seeger

Dr. Seeger is an assistant professor of finance. His main research areas are asset pricing, financial econometrics, derivatives, commodities, international macroeconomics and finance. His research has been published in The Journal of Business & Economics Statistics and The Journal of Futures Markets.
This course is dedicated (and reserved) for DHP QRM students. It extends undergraduate knowledge of econometric theory and methods at the graduate level, focusing on a number of selected methods and models. Estimators for both linear and non-linear models will be examined, including least-squares, and generalized methods of moments. Point estimation as well as confidence interval estimation will be considered. The methodology will be combined with typical financial econometrics models and applications.

Dr. C.S. Bos (coordinator)

Dr. Bos is associate professor of Econometrics. His research interests include time series econometrics, Bayesian time series analysis, state space methods, and financial econometrics. He has published in journals such as *Journal of Applied Econometrics, Econometric Reviews, Computational Statistics and Data Analysis, Journal of Financial Econometrics, International Journal of Forecasting*.

Prof. dr. A. Lucas

EXCEL TESTS

The Excel tests are a preparation for the Masters program. They consist of two parts.

- Optimization, regression, lookup and matching. This should be familiar if you hold a bachelor degree and have taken an investment-related course (entry requirement).
- VBA, dynamic arrays, looping, conditionality.

Students prepare the tests at home. The learning material is online through YouTube videos and example spreadsheets. See [xlvu.weebly.com](http://xlvu.weebly.com).

Dr. A.H. Siegmann

FINANCIAL ETHICS

Ethics and professional conduct is a prime topic in modern finance, and included in all professional training programmes including for instance CFA. Professional ethics is questioning the behaviour of individuals acting in professional capacities. Does the organizational context make a difference here?

The course briefly will explore questions such as:
- If my profession knows an own professional code of ethics how is compliance with such a code ensured? What types of instruments are available?
- How should corporations and non-profit organizations be managed in such way that they proceed in a morally acceptable manner?
- What sort of professional (in)dependence professional staff may enjoy within the setting of an organization?

Prof. dr. ir. H.A. Rijken

Regulation is a core component in the financial industry. In this course, we consider the different types of regulations from various perspectives, applied to the (very) different segments of the financial industry. We particularly focus on how regulation and conduct are intertwined, what behavior is induced, and how this can be enforced. In this sense, the course also follows up on the course in financial ethics.

Instructor t.b.a.
INSTITUTIONAL INVESTMENTS AND ALM

In this course, students learn to analyze the investment process of institutional investors, like pension funds, and the concept of balance sheet management (Asset and Liability Management). We analyze fixed income instruments including fixed income derivatives. Students learn to setup a hedging portfolio to hedge fixed income risk. Derivatives 4.2 is a pre-requisite.

Dr. M.J. Boes

Dr. Boes is head of investment risk management at ABN Amro Pension Fund and assistant professor of finance. Dr. Boes is the coordinator of the course. His research interests are pension funds, derivatives and risk management. He has published in *Journal of Financial and Quantitative Analysis*. 
The objective of this course is to develop a deep understanding of modern quantitative risk measurement and management techniques and an ability to apply these techniques to settings of practical interest. Quantitative techniques are applied to recent development on the area of counterparty credit risk, currently the most important topic in derivatives markets. This course should set you well on your way for a risk management / quant position at a financial institution.

Dr. S.A. Borovkova (coordinator)

Dr. A. van Haastrecht
Dr. van Haastrecht is a risk management consultant insurance companies and assistant professor of finance. His research interests include quantitative risk management, ALM, and interest rate derivatives. He has published in Quantitative Finance, Insurance: Mathematics and Economics, Journal of Futures Markets, Journal of Computational Finance and the International Journal of Theoretical and Applied Finance.
This course studies the analysis of real estate markets and the investment alternatives available to both debt and equity investors. It highlights the management of real estate portfolios, the analysis of mortgage markets, housing markets, and risk and return analysis applied to the main investment vehicles in real estate.

Dr. F. Hamelink

Dr. Hamelink is Associated Professor of Finance at the VU and a Fiduciary Manager with a Lombard Odier Asset Management in Geneva, where he oversees large pension funds’ portfolios. His research interests are real estate investment, quantitative investment and risk modeling. He has published in *Journal of Property Research, European Journal of Finance, Real Estate Economics, Journal of Housing Economics.*

Prof. dr. J. Rouwendal (coordinator)

Prof. Rouwendal is Professor at the Department of Spatial Economics. His research interests are the economic evaluation of cultural heritage, economic analysis of spatial planning, aging and housing. He is a research fellow of the Tinbergen Institute, an academic partner to the CPB and a senior researcher at Netspar. He has published in *Journal of Urban Economics, Journal of Applied Econometrics.*
In the research project you learn to apply your knowledge to a research question in the field of Finance. To successfully complete the research project, you have to
• identify the relevant academic literature
• formulate a precise research questions and hypotheses
• Collect and format the relevant data
• choose the appropriate (statistical) methodology for the research
• interpret the findings
• communicate the results to peers, in writing as well as in a presentation
• cooperate in a team to increase team output on a research project

Topics and teams are allocated during period 2. The research is prepared during December, and really takes shape in the 4 weeks of period 3. Attendance is compulsory during the discussion sessions, and you need to be available full time for your time: so no winter holidays during period 3!

Dr. G. Tumer-Alkan
Dr. Tumer-Alkan is assistant professor in finance. Her research interests are in banking, financial intermediation, and financial integration. She has published on this in Journal of Banking and Finance, Journal of Financial Stability, European Economic Review, Journal of Corporate Finance, Journal of Financial Services Research. Professor Tumer-Alkan is coordinator of the research project. More faculty are involved in the actual supervision of the research projects.
The objective of this course is to learn basics of stochastic processes in continuous time, including the concepts of martingales and stochastic integration, and to apply these concepts to price options on stocks and interest rates by the no-arbitrage principle. This establishes the mathematical tools and theory behind risk management. We develop the Martingale theory in discrete and continuous time. We discuss some properties of the Gaussian process and introduce "stochastic integrals" with Brownian motion as the integrator. Financial processes can next be modeled as solutions to "stochastic differential equations". After developing these mathematical tools we turn to finance by applying the concepts and results to the pricing of derivative instruments and other matters.

**dr. E. Belitser**

Dr. Belitser is assistant professor of Mathematics. His research interests are in mathematical statistics, in particular: nonparametric Bayesian inference, minimax curve estimation, adaptive procedures, sequential estimation algorithms. He has published widely in journals such as *Journal of Statistical Planning and Inference, Bayesian Analysis, Sequential Analysis, Scandinavian J. Statistics, Annals of Statistics, Theory of Stochastic Processes.*
The thesis is an important part of your academic training where all the previous elements come together: knowledge, skills, attitude, and creativity. It gives you the opportunity to engage in your own independent academic research and to give your distinctive signature of what you can do in a relatively short period of time. This can be a valuable signal towards the labor market.

A variety of faculty members is involved in thesis supervision. The logistics of the thesis process are tightly scheduled in either the Spring or the Fall semester, so that you have two options to start your thesis. The thesis has to be completed in three months time, with an exception if you have an approved internship linked to your thesis topic.

You should have passed a minimum number of two core courses plus the Research Project 4.3 to be allowed to start the thesis.

The thesis manual will be made available in October.

Prof. dr. A.C.F. Vorst

Professor Vorst is professor in Finance and this year’s coordinator of the thesis process. Next to his academic career, he has a wide experience in banking as head of Risk Management at both ABNAMRO and RBS. He has published internationally in *Journal of Finance*, *Journal of Financial and Quantitative Analysis*, *Journal of International Money and Finance*, *Journal of Applied Econometrics*. 

All thesis correspondence via: finthesis.feweb@vu.nl
This course elaborates on the course Advanced Corporate Finance and has a strong focus on corporate valuation. Financing and Valuation are closely connected in the field of Corporate Finance. Key topics are cash flow valuation techniques (theory and practice) and pricing models for equity investments and debt investments. We follow closely the standard methodology practiced by professionals and confront this with the standard academic literature on Corporate Valuation. Specialized topics will be addressed: balance sheet valuation, corporate valuation in practice with multiples, measurement of value creation, corporate valuation in special cases of high growth perspectives, high current investments, real estate and real option valuation etc. Corporate Valuation topics will be applied in several business cases.

Dr. M. Millone

Dr. Millone is assistant professor in finance. He has a multidisciplinary background in Economics, Law and Political Science. His work is focused on banking in emerging countries and the interaction between social and financial performance at the level of both institutions and investors. His work on benchmarking the performance of Microfinance Institutions (MFIs) has been published on World Development. He is currently interested in regulatory arbitrage in banking and alternative finance.