Finance (MSc)

Vrije Universiteit Amsterdam - School of Business and Economics - M Finance - 2017-2018

The Master's programme in Finance is an intensive yet flexible programme, which provides a rigorous training in all key aspects of finance. For students with an appropriately quantitatively oriented university bachelor degree, the master's programme offers the Duisenberg Honours Programme in Quantitative Risk Management.

In periods 1 and 2, we offer the four core courses: Advanced Corporate Finance, Asset Pricing, Financial Markets and Institutions, and Empirical Finance. The first three correspond to the three main pillars in finance; the fourth is a methods course relevant for all pillars. Starting from period 3, you will start specializing in one of the three learning lines, corresponding to the three main pillars in finance: corporate finance, investments, or institutional finance. The specialization phase starts in period 3 with the Research Project, followed by a corresponding set of electives in period 4. In periods 5 and 6, you will write your thesis.

Throughout the year, you will work on your portfolio. This helps you to further develop your ‘soft skills’, and will guide you in the transition from a student to an academic professional.

The MSc Finance is a one year full-time programme, is taught in English, comprises 60 EC, and consists of several specializations. In addition, there is a Duisenberg Honours Programme in Quantitative Risk Management of 84 EC.
- General information
- Course schedule
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  - Duisenberg Honours Programme in Quantitative Risk Management

- Academic and Examination Regulations (OER) SBE Master’s degree programmes
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Inhoudsopgave

Master Finance

The Master Finance consists of obligatory courses, electives and a thesis.

Opleidingsdelen:

- Master Finance - Obligatory courses
- Master Finance - Electives

Master Finance - Obligatory courses

Five courses and a thesis are obligatory

Vakken:

Naam	Periode	Credits	Code
Advanced Corporate Finance	Periode 1	6.0	E_FIN_ACF
Asset Pricing	Periode 1	6.0	E_FIN_AP
Empirical Finance	Periode 2	6.0	E_FIN_EF
Financial Markets and Institutions	Periode 2	6.0	E_FIN_FMI
Portfolio Finance	Ac. Jaar (september)	0.0	E_BA_PTFIN
Research Project for Finance	Periode 3	6.0	E_FIN_RPFIN
Thesis MSc Finance	Ac. Jaar (september)	18.0	E_FIN_THS

Master Finance - Electives

Choose 2 courses of 6 EC each. Note that you are not allowed to combine the courses Corporate Valuation and Corporate Valuation for Finance.

In addition you may opt for an intership of 0 EC.

Vakken:

Naam	Periode	Credits	Code
Bank Management	Periode 4	6.0	E_BA_BANKM
Behavioral Finance	Periode 4	6.0	E_FIN_BF
Corporate Valuation	Periode 2	6.0	E_BA_CV
Corporate Valuation for Finance	Periode 4	6.0	E_FIN_CVF
Credit, Complexity and Systemic Risk	Periode 5	6.0	E_FIN_CCSR
Derivatives	Periode 4	6.0	E_FIN_DER
Economics of Payment Systems	Periode 4	6.0	E_FIN_EPS

Institutional Investments and Asset Liability Management	Periode 4	6.0	E_FIN_IIALM
Internship MSc Finance	Ac. Jaar (september)	0.0	E_FIN_INTFIN
Macro and International Finance	Periode 4	6.0	E_FIN_MIF
Quantitative Financial Risk Management	Periode 4	6.0	E_FIN_QFRM
Real Estate Management	Periode 5	6.0	E_BA_REM

Master Finance - Duisenberg Honours Programme Quantitative Risk Management

For students with an appropriate quantitatively oriented university bachelor degree, we offer the Duisenberg Honours Programme in Quantitative Risk Management within the MSc Finance programme. Upon successful completion, students obtain an MSc Finance diploma, with the diploma annex clearly stating that the student successfully completed the Duisenberg Honours Programme.

For more information on this programme, see the Master site of the university (www.vu.nl > study at vu amsterdam > Finance (Msc) > Duisenberg honours programmes in Quantitative Finance and Risk Management)

Opleidingsdelen:

- M Finance - Duisenberg QRM - Obligatory
- M Finance - Duisenberg QRM - Electives

M Finance - Duisenberg QRM - Obligatory

The Honours programme contains 9 obligatory courses plus a thesis.

Vakken:

Naam	**Periode**	**Credits**	**Code**
Asset Pricing	Periode 1	6.0	E_FIN_AP
Credit, Complexity and Systemic Risk	Periode 5	6.0	E_FIN_CCSR
Derivatives	Periode 4	6.0	E_FIN_DER
Econometrics for Quantitative Risk Management	Periode 1+2	6.0	E_FIN_EQRM
Financial Markets and Institutions	Periode 2	6.0	E_FIN_FMI
Institutional Investments and Asset Liability Management	Periode 4	6.0	E_FIN_IIALM
Portfolio Finance	Ac. Jaar (september)	0.0	E_BA_PTFIN
Quantitative Financial Risk Management	Periode 4	6.0	E_FIN_QFRM
Research Project for Finance	Periode 3	6.0	E_FIN_RPFIN

Stochastic Proces for Finance	Periode 1+2	6.0	E_FIN_SPF
Thesis MSc Finance - Duisenberg HP	Ac. Jaar (september)	18.0	E_FIN_THSHT

M Finance - Duisenberg QRM - Electives

Choose 2 courses from the list.

Vakken:

Naam	Periode	Credits	Code
Behavioral Finance	Periode 4	6.0	E_FIN_BF
Data Mining Techniques	Periode 5	6.0	X_400108
Macro and International Finance	Periode 4	6.0	E_FIN_MIF
Time Series Econometrics	Periode 4	6.0	E_EORM_TSE

Master Finance - Transitional arrangements

Below the courses that will not be lectured anymore from 2017-2018. The transitional arrangements can be found at the introduction page of this study guide.

Vakken:

Naam	Periode	Credits	Code
Financial Sector Regulation	Periode 1	6.0	E_BA_FSR
Thesis MSc Duisenberg QFRM	Ac. Jaar (september)	21.0	E_FIN_THSQFD

Advanced Corporate Finance

Vakcode	E_FIN_ACF ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	School of Business and Economics
Coördinator	prof. dr. ir. H.A. Rijken
Examinator	prof. dr. ir. H.A. Rijken
Docent(en)	prof. dr. ir. H.A. Rijken
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	400

Doel vak
This course is an advanced course in Corporate Finance.

The Corporate Finance discipline is about matching companies' assets

with investor's preferences. It has both a micro perspective on CFO decision making and a macro perspective on the functioning of Corporate Financial Markets. It applies to CFO's at non-financial companies and financial institutions and to policy makers.

This course has three main learning objectives.
1. Extending academic/ professional knowledge about Corporate Finance: learning about academic concepts in Corporate Finance. (Technical knowledge)
2. Applying academic concepts in Corporate Finance in real life cases: confrontation of academic concepts in Corporate Finance with real life situations. (Problem-solving skills; Conceptual reasoning; Communication skills)
3. Understanding the origin and empirical strength of academic concepts in Corporate Finance: test of underlying assumptions and robustness in empirical (academic) research. (Critical skills; Conceptual reasoning)

This course will give most attention to objectives 1 and 2. Objective 2 makes this course relevant for professional practice.

After following this course, you:
- Understand basic Corporate Finance concepts in economic terms, including their strengths and limitations.
- Have (quantitative skills) to apply these basic concepts.
- Understand the unique features of each concept and interrelationship between them.
- Are able to choose between various concepts and apply them in specific real life cases.

More specific learning objectives for the working classes and case solving are:
- Students are able to analyze and solve a case in Corporate Finance;
- write a (consulting) report on a case in Corporate Finance;
- Students are able to raise questions during the working class and to formulate their own position;
- Students are able to present their case solutions.

Inhoud vak
The course consists of lectures and working classes. Most important topics in this course are
- leverage decision
- dividend decision
- risk management
- credit risk measurement (including rating agencies)
- credit risk pricing
- corporate debt market
- structured corporate finance (project finance, asset securitization, LBO)
- quantitative pricing of debt (value of debt in distress situations and convertible debt valuation.
- equity risk pricing

Onderwijsvorm
Lectures and working classes

Toetsvorm
TBA

Literatuur
TBA

Vereiste voorkennis
This course elaborates on classical text books like Corporate Finance (Berk and DeMarzo) and Principles of Corporate Finance (Brealey, Myers and Allen). These books mark the entry knowledge level of this course. The book Corporate Finance (Berk and DeMarzo) is comprehensively discussed and tested in the VU bachelor programme Economics and the VU bachelor programme Business Administration.
Students not very familiar with these books are advised to have a look at these books or even buy it for (required) background knowledge to this course.

Asset Pricing

Vakcode	E_FIN_AP ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	School of Business and Economics
Coördinator	prof. dr. R.C.J. Zwinkels
Examinator	prof. dr. R.C.J. Zwinkels
Docent(en)	prof. dr. R.C.J. Zwinkels
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	400

Doel vak
This course aims to deepen your knowledge in the field of asset pricing and investments.

After completion of the course, you should:
- Understand the determinants of equity returns.
- Understand and be able to apply optimal asset allocations for both individual and institutional investors.
- Acquire an academic and critical attitude towards competing theories in investment questions.
- Be comfortable with doing advanced analyses on large data sets in software such as Microsoft Excel.

Inhoud vak
Starting from basic (undergraduate) Investments knowledge, this course centers around the issues of asset pricing and investments. In the first week we revisit the well-known mean-variance framework and derive the standard CAPM. Starting from the second week, we carefully study the assumptions underlying the CAPM framework and ask ourselves what they imply for asset pricing. Examples include the assumption of mean-variance utility, rational expectations, and complete arbitrage. In the final week, we take a sidestep towards delegated asset management. Throughout the course, neoclassical and behavioral theories confronted with each other. The course builds on a combination of theory and empirics. Throughout the course, students will compete in an investment game in which they can directly apply their newly acquired knowledge and experience the real-life issues associated with investing.

Onderwijsvorm
Each of the six weeks of the course feature four hours of lectures and two hours of tutorials. The content of the tutorials varies. There will, for example, be guest lectures from finance practitioners, discussions of the assignments, and in-depth discussions of particular technical issues.
The focus of the assignments is to apply the theoretical knowledge from class to real world problems using actual stock market data in Excel or
other software. In addition to gaining a deeper understanding of the topics in the course, the assignments will train you in quantitative computer skills you will need later in their career and prepare you for similar assignments in other courses and your thesis.

Toetsvorm
Final grade = 0.75*(written exam grade) + 0.25*(assignments grade).

To pass this course, you need a minimum final grade of 5.5 and a minimum grade of 5.0 on the written exam.

Literatuur
- Selected research articles.
- Lecture notes.

Vereiste voorkennis
You should be familiar with investments at the level of Bodie, Kane & Marcus, Investments. Undergraduate level knowledge of statistics and mathematics is also required (e.g., Berenson, Levine, Krehbiel: Basic Business Statistics; and Sydsaeter and Hammond (2006; Prentice Hall): Essential Mathematics for Economic Analysis, Sydsaeter, Hammond, Seierstad, and Strom (2005; Prentice Hall): Further mathematics for Economic Analysis (chapters 4 and 11)).

Aanbevolen voorkennis
You are expected to be very versatile in a relevant software package, such as Microsoft Excel (or any other similarly advance package) and use it to perform estimation and optimization. Core texts here are Benninga, Financial Modeling, or (more advanced) Jackson and Staunton, Advanced modeling in Finance using excel and VBA.

Overige informatie
This course can have an in-depth follow-up by choosing the investments learning line, consisting of an
appropriate investments related Research Project in period 3 as well as related electives in period 4 (e.g., Institutional Investments and ALM, Macro and International Finance, Behavioral Finance, Quantitative Risk Management).

Bank Management

Vakcode	E_BA_BANKM (61442330)
Periode	Periode 4
Credits	6.0
Voertaal	Engels
Faculteit	School of Business and Economics

Coördinator	drs. T.A.J. de Jong
Examinator	drs. T.A.J. de Jong
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	400

Doel vak
This course aims to deepen your knowledge on the business model of banks and the role they have in the wider economy. After completion of the course, you should:
Have a thorough understanding of how banks make their money and the risks involved.
Understand the concept of Asset & Liability Management, including capital.
Explain the role of the different regulators and outline the most important new regulations that apply to banks and how these will impact their business model.
Assess a credit request and be able to apply a credit risk analysis for a corporate, form an opinion and decide on the request.
Acquire an academic and critical attitude towards the financial system in general and the role of banks in particular.
Understand the basics of Financial Stability and monetary policy and the impact on banks.
Understand and explain the concept of money creation.

Inhoud vak
This course is a multidisciplinary course and deals with two important aspects of bank management: the bank business model and business process management within a bank. The fist topic is about financial economics, however we will also zoom into the broader function of banks in the macro economy. The second is about business process management. In more detail there are 4 building blocks: The first building block is about the position of banks in the wider economy. Both the academic frameworks re macro and financial economy will be studied. The second building block is about bank management and consist of balance sheet risk management and credit risk. Re the latter, the loan portfolio is on average 50-75% of the portfolio and determines for a large part the business model of a bank. Focus will not only be on individual credits, also techniques to manage the loan portfolio will be studied. Balance sheet risk management consist out of capital, interest rate risk and liquidity. Managing financial risk at both the asset and liability side is key for banks. The recent banking crisis shows the impact of overlooking and underestimation 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. The third building block focus on the regulatory environment. The Basel Framework has and has to be aligned with the Basel Framework, including Basel III and an outlook to Basel IV. Finally there will be attention for ‘banking’ alternatives. What is the future business model of banks, is it still viable in the coming decade?

Onderwijsvorm
Lectures, and a (group) assignment

Toetsvorm
To pass this course, you need a minimum final grade of 5.5. The final grade is given by: Final grade = 0.7*(Written exam grade) + 0.1 * (Individual Case) + 0.2*(Group assignment).

Literatuur
Bank Management & Financial Services, by Rose & Hudgins, 9th

Behavioral Finance

Vakcode	E_FIN_BF ()
Periode	Periode 4
Credits	6.0
Voertaal	Engels
Faculteit	School of Business and Economics
Coördinator	prof. dr. M.J. van den Assem
Examinator	prof. dr. M.J. van den Assem
Lesmethode(n)	Hoorcollege
Niveau	400

Doel vak
The aims of this course are to understand
- how people are subject to distortions or biases in their beliefs, such as overconfidence and optimism,
- that people have preferences that are not understood in a normatively acceptable framework, and exhibit for example loss aversion and narrow framing, and
- why such phenomena are highly relevant in the contexts of firms and financial markets.

Inhoud vak
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 and behavioral economics. It repeatedly contrasts decision making behavior with rational norms and explains why people deviate systematically from these norms. Understanding your own financial decision processes and those of others is fundamental to virtually every aspect of financial management, including valuation, capital budgeting, corporate governance, portfolio selection, financing issues, dividend policy, and risk management.

Onderwijsvorm
Lectures (2 times 2 hours per week)

Toetsvorm
Written exam (80%) and assignment (20%)

Literatuur
- Bazerman & Moore, Judgment in Managerial Decision Making, Wiley, most recent edition.
- Selected articles (to be announced).

Vereiste voorkennis
None

Overige informatie
- This course is an elective for the MSc Finance and for the MSc Business Administration (Financial Management track).
- In the MSc Business Administration (Financial Management track) this

course was formerly known as Financial Decision Making. Behavioral Finance and Financial Decision Making have merged into Behavioral Finance, with no material changes to the content.
- This elective should NOT be chosen by students who have followed the BSc3 course Judgment and Decision Making (part of the Minor "Understanding and Influencing Decisions in Business and Society") because of substantial overlap.

Corporate Valuation

Vakcode	E_BA_CV ()
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	School of Business and Economics
Coördinator	dr. M. Millone MSc
Examinator	dr. M. Millone MSc
Docent(en)	dr. M. Millone MSc
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	400

Doel vak
This course elaborates on the course Advanced Corporate Finance 4.1. Aim is to complete the overview of the Corporate Finance field. Corporate
Valuation is closely interconnected with Corporate Financing decisions.

Inhoud vak
The course kicks off with a discussion of value drivers and Financial Statement Analysis. A valuation starts with a thorough understanding of the business strategy and an analysis of the financial figures. Quickly thereafter the hard core of Corporate Valuation will be outlined: CF valuation techniques (theory and practice) and pricing models for equity investments and debt investments. We follow closely the methodology as outlined by McKinsey, regarded by professionals as the standard practice.

Corporate valuation depends very much on the perception of investors in financial markets. Therefore attention will be paid to the perspective of banks as loan providers, investment banks as dealers, equity analysts and private equity funds. These topics will be the basis of two guest lectures.
After this overview, specialized topics will be addressed: corporate valuation of start-ups, valuation of
corporate social responsibility and finally we will discuss the valuation of companies such as Facebook and Instagram.

Corporate Valuation topics will be applied in three business cases provided by the coordinator and one case provided by a guest lecturer.

Onderwijsvorm
Lectures (2 times 2 hours per week) and tutorials (1 time 2 hours per week).

Toetsvorm
Written exam (60%) and four case assignments (40%).

Literatuur
- Reading material provided on Canvas.
- Harvard business case course pack (this will be made available for purchase at the beginning of the course).
- Valuation, McKinsey (6th edition). (The 5th edition of this book can also be found as an e-book, but the students will be responsible to match the content between the two editions and no rights can be derived from using the older version of the book).

Vereiste voorkennis
Advanced Corporate Financial Management 4.1

Corporate Valuation for Finance

Vakcode	E_FIN_CVF ()
Periode	Periode 4
Credits	6.0
Voertaal	Engels
Faculteit	School of Business and Economics
Coördinator	dr. M. Millone MSc
Examinator	dr. M. Millone MSc
Docent(en)	dr. M. Millone MSc
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	400

Doel vak
This course elaborates on the course Advanced Corporate Finance 4.1. Aim is to complete the overview of the Corporate Finance field. Corporate
Valuation is closely interconnected with Corporate Financing decisions.

Inhoud vak
The course kicks off with a discussion of value drivers and Financial Statement Analysis. A valuation
starts with a thorough understanding of the business strategy and an analysis of the financial figures.
Quickly thereafter the hard core of Corporate Valuation will be outlined: CF valuation techniques (theory and practice) and pricing models for equity investments and debt investments. We follow closely the methodology as outlined by McKinsey, regarded by professionals as the standard practice.

Corporate valuation depends very much on the perception of investors in financial markets. Therefore attention will be paid to the perspective of banks as loan providers, investment banks as dealers, equity analysts and majority shareholders. These topics will be the basis of two guest lectures.
After this overview specialized topics will be addressed: corporate valuation in special cases of start-ups, valuation of
corporate social responsibility and finally we will discuss the valuation of companies such as Facebook and Instagram.

Corporate Valuation topics will be applied in 3 business cases provided by the coordinator and 1 case provided by a guest lecturer.

Onderwijsvorm
Lectures (2 times 2 hours per week) and work groups (1 time 2 hours per week)

Toetsvorm
written exam (60%) and four case assignments (40%)

Literatuur
- Reading material provided on black board
- Harvard business case course pack (this will be made available for purchase at the beginning of the course)
- Valuation, McKinsey (6th edition). (The 5th edition of this book can also be found as an e-book, but the students will be responsible to match the content between the two editions and no rights can be derived from using the older version of the book).

Credit, Complexity and Systemic Risk

Vakcode	E_FIN_CCSR ()
Periode	Periode 5
Credits	6.0
Voertaal	Engels
Faculteit	School of Business and Economics
Coördinator	dr. A. van Haastrecht
Examinator	dr. A. van Haastrecht
Lesmethode(n)	Hoorcollege
Niveau	400

Doel vak
At the end of the course, students will have a good understanding of quantitative risk management methods used by financial institutions and the challenges currently worked upon in the industry.

Inhoud vak
Credit risk management is of vital importance for banks, insurers and pension funds. Realistic modelling techniques are required for suitably managing credit risk exposures in loans, bonds and credit-risky securities. Explicit attention will go out to recent developments for the pricing and risk management of credit risk, such as default modelling, credit valuation adjustments, funding. Tools for mitigating counterparty credit risk discussed, among others collateral management and central clearing parties.

In this course, we will also learn about systemic risk, which is the risk associated with the financial system as a whole (rather than risk associated with one particular financial institution). We will investigate how complex relationships between financial system participants influence systemic risk, how it can be measured and which tools are there to control this risk. We will address as a specific example of systemic risk issues related to central clearing of derivatives and the resulting relations between credit and liquidity risk.

Onderwijsvorm
Lectures

Toetsvorm
Written exam plus assignments

Literatuur
Contents from the following books will be used:

Jon Gregory (2015): The xVA Challenge: Counterparty Credit Risk, Funding, Collateral, and Capital, 3rd Edition, ISBN: 978-1-119-10941-9.
Brigo et al. (2013): Counterparty Credit Risk, Collateral and Funding: With Pricing Cases For All Asset Classes, ISBN: 978-0-470-74846-6.

Vereiste voorkennis
Basic knowledge of probability and statistics.

Aanbevolen voorkennis
Basic knowledge of derivatives.

Doelgroep
Quantitative Finance, Finance, Econometrics and Operations Research.

Overige informatie
This course is meant for students pursuing a career in risk management at financial institutions such as banks, insurers and pension funds. Explicit links between academic models and their practical applicability will be discussed in the lectures and case studies.

Data Mining Techniques

Vakcode	X_400108 (400108)
Periode	Periode 5
Credits	6.0
Voertaal	Engels
Faculteit	Faculteit der Exacte Wetenschappen
Coördinator	dr. M. Hoogendoorn
Examinator	dr. M. Hoogendoorn
Docent(en)	dr. M. Hoogendoorn
Lesmethode(n)	Hoorcollege
Niveau	500

Doel vak
The aim of the course is that students acquire data mining knowledge and skills that they can apply in a business environment. How the aims are to be achieved: Students will acquire knowledge and skills mainly through the following: an overview of the most common data mining algorithms and techniques (in lectures), a survey of typical and interesting data mining applications, and practical assignments to gain "hands on" experience. The application of skills in a business environment will be simulated through various assignments of the course.

Inhoud vak

The course will provide a survey of basic data mining techniques and their applications for solving real life problems. After a general introduction to Data Mining we will discuss some "classical" algorithms like Naive Bayes, Decision Trees, Association Rules, etc., and some recently discovered methods such as boosting, Support Vector Machines, and co-learning. A number of successful applications of data mining will also be discussed: marketing, fraud detection, text and Web mining, possibly bioinformatics. In addition to lectures, there will be an extensive practical part, where students will experiment with various data mining algorithms and data sets. The grade for the course will be based on these practical assignments (i.e., there will be no final examination).

Onderwijsvorm
Lectures (h) and compulsory practical work (pra). Lectures are planned to be interactive: there will be small questions, one-minute discussions, etc.

Toetsvorm
Practical assignments (i.e. there is no exam). There will be two assignments done in groups of three. There is a possibility to get a grade without doing these assignments: to do a real research project instead (which will most likely to involve more work, but it can also be more rewarding). For the regular assignments the first assignment counts for 40% and the second for 60%. The grade of both assignments needs to be sufficient to pass the course.

Literatuur
Ian H. Witten, Eibe Frank, Mark A. Hall, Data Mining: Practical Machine Learning Tools and Techniques (Third Edition). Morgan Kaufmann, January 2011
ISBN 978-0-12-374856-0

Aanbevolen voorkennis
Kansrekening and Statistiek or Algemene Statistiek (knowledge of statistics and probabilities) or equivalent. Recommended: Machine Learning.

Doelgroep
mBA, mCS, mAI, mBio

Derivatives

Vakcode	E_FIN_DER (60442060)
Periode	Periode 4
Credits	6.0
Voertaal	Engels
Faculteit	School of Business and Economics
Coördinator	dr. N.J. Seeger
Examinator	dr. N.J. Seeger
Docent(en)	dr. N.J. Seeger
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	400

Doel vak
The primary objective of this course is to provide students with an advanced introduction to derivative instruments. By the end of the course students should have a sound understanding of the pricing concepts, practical applicability, operational complexity, and risks of several linear and non-linear derivatives.

Inhoud vak
In todays financial world, the role of derivatives gets increasingly important. Banks and pension funds use derivatives to manage their balance sheet risk, corporate treasuries need derivatives for mitigation of international trade risk, insurance companies actively apply derivatives strategically in order to hedge long term interest rate exposures. Worldwide derivatives trading has exploded to unprecedented levels in the last decades. Therefore, a sound understanding of derivatives is indispensable for anyone pursuing a job in finance.

The course aims to help students in developing a general understanding of the fundamental principles related to derivative instruments. When we try to understand derivative instruments we will ask questions like:

1. How do derivative instruments work?
2. Is it possible to decompose derivatives in basic assets?
3. How to determine the fair value of derivative instruments?
4. What are the risks of using derivative instruments?
5. How are derivative instruments applied in practice and are there any relevant operational issues in the real world?

Hence, the course focuses on facilitating conceptual understanding of derivative instruments and of the methods that are needed to apply derivatives in different settings of finance applications; whether it is for trading purposes, structuring products, risk management, etc.

The field of derivatives is one of the most mathematically sophisticated in finance. Therefore, to understand derivatives it is inevitable to deal with mathematical methods. However, we want to emphasize that in the course mathematical methods are primarily used as tools to understand derivatives. We intend to serve a balanced mix of theory, intuition and practical aspects.

The course will treat the following subjects:

- Why derivatives?
- Forwards, futures and options
- Pricing concepts of derivative instruments
- Discrete and continuous time option pricing models
- Understanding Black-Scholes formula
- Beyond Black-Scholes (stochastic volatility and jumps)
- Hedging strategies
- Estimating model parameters
- Credit derivatives / Financial Crisis

Onderwijsvorm
The course spans a period of six weeks. There will be 12 lecture sessions of 2 x 45 minutes each (for dates and times see course schedule), in which the course material is presented. There will be two additional tutorial sessions in which solutions to programming problems

related to derivatives topics will be discussed.

Toetsvorm
The final grade of the course is the grade of the written exam.

Literatuur
- Lecture slides
- John Hull: Options, Futures and other Derivatives, 8th Edition, 2011

Further References:
- Das, R.K. and S.R. Sundaram: Dervatives: Principles and Practice, McGRAW-Hill International Edition, 2010
- Jarrow, R. and A. Chatterjea: An Introduction to Derivative Securities, Financial Markets, and Risk Management, W. W. Norton & Company, 2013
- Baxter/Rennie: Financial Calculus, Cambridge, 1996. - Neftci: Principles of Financial Engineering, Elsevier, 2nd edition, 2008.
- Bingham/Kiesel: Risk-Neutral Valuation: Pricing and Hedging of Financial Derivatives, Springer, 2004.
- Björk, T.: Arbitrage Theory in Continuous Time, Oxford University Press, 2004.

Vereiste voorkennis
Students entering this course should be familiar with the basic corporate finance principles and techniques (e. g. Berk/DeMarzo, Corporate Finance. 2013) and investment management concepts (e. g. Bodie, Investments. 2010). In order to follow the course material right from the start it is recommended to review the derivatives material that has been covered in the courses: Financiering 2.5 and Investments 3.4. For solving the assignments, programming experience with Excel/VBA is required. A very good introduction to Excel/VBA can be found on the homepage http://xlvu.weebly.com; provided by Dr. Arjen Siegmann.

Econometrics for Quantitative Risk Management

Vakcode	E_FIN_EQRM ()
Periode	Periode 1+2
Credits	6.0
Voertaal	Engels
Faculteit	School of Business and Economics
Coördinator	dr. C.S. Bos
Examinator	dr. C.S. Bos
Docent(en)	prof. dr. A. Lucas, dr. C.S. Bos
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	400

Doel vak
Upon successful completion, students should
• have a thorough understanding of econometric estimation methodology (extremum estimation, regression, maximum likelihood, GMM);
• understand the asymptotic statistical behavior of typical estimation methodologies and have the means to develop inference procedures to answer finance/econometric questions of interest;
• be aware of typical statistical complications in financial econometrics and how to deal with these (endogeneity, time series

variation and model instability, unit roots and spurious regression, cointegration, heteroskedasticity, alternative standard errors);
• be able to implement econometric methods in computer code and run simulations to study the properties of estimation and inference procedures;
• download, process, and use real financial data, obtain results, and critically interpret the results obtained;
• be able to report the results clearly and concisely;
• be able to understand and critically evaluate financial econometric research as presented in the academic literature;
In this way students should be well prepared for the team research project in Block 3, and for the academic thesis in Block 5/6.

Inhoud vak
This is a specialized course for the Duisenberg Honours Programme in Quantitative Risk Management and is not accessible to students outside this programme.
The course starts out with a series of models commonly applied in the financial econometrics literature and practice. These include linear and non-linear regression, maximum likelihood estimation, and GMM. We consider time series, cross-sectional, and panel data settings. The common ground in estimation and inference behind these models is investigated, leading towards the theory for a general statistical framework for extremum estimators and inference procedures in the second part of the course.
Students are required to implement some of the methods in case assignments using computer coding. We use Python as our standard programming language, but students are free to choose some other language if they prefer.

Onderwijsvorm
2h lectures, 2h tutorials, over two periods

Toetsvorm
Intermediate exam, final written exam, case work.

Literatuur
Tsay, R. S. (2010): Analysis of Financial Time Series, 3rd edition. John Wiley & Sons. http://dx.doi.org/10.1002/9780470644560
Hansen, B. E. (2016): Econometrics.
http://www.ssc.wisc.edu/~bhansen/econometrics

Vereiste voorkennis
Students should have a sound knowledge of Probability Theory and Mathematical Statistics, Linear Algebra and Calculus, as well as an introductory knowledge in Econometrics. They should also be familiar with basic bachelor level finance concepts. Students should also master a matrix-oriented programming language. During the course, Python is used (see e.g. https://www.kevinsheppard.com/Python_for_Econometrics). A bootcamp ‘Principles in Programming in Econometrics’ is organized for Python and/or Matlab in the last week of August, before the start of the course. Please register by signing up in Canvas for the bootcamp.

Indication of entry level:
Edwards, C. H. and D. E. Penney (2007). Calculus, with Early Transcendentals. New International ed of 7th Revised. Pearson.
Casella, G. and R. L. Berger (2008). Statistical Inference. International edition of 2nd revised. Cengage Learning, Inc.
Stock, J. H. and M. W. Watson (2011). Introduction to

Econometrics.
3rd. UK: Pearson Education.
Bodie, Z., A. Kane, and A. Marcus (2013). Investments. 10th.
McGraw-Hill Education.

Economics of Payment Systems

Vakcode	E_FIN_EPS ()
Periode	Periode 4
Credits	6.0
Voertaal	Engels
Faculteit	School of Business and Economics
Coördinator	prof. dr. W. Bolt
Examinator	prof. dr. W. Bolt
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	400

Doel vak
The aim of the course is to analyze the economics of payment markets in terms of pricing, competition, innovation and design. The retail payment landscape is changing fast: new players, new technologies, and new business models. How can we assess and evaluate these changes within a theoretic "multi-sided platform" framework, can we validate these models empirically, and what does it imply for modern competition policy and regulation?

After following this course, you will be able to:
- understand the industrial organization of the modern payment industry,
- understand the economics of payment systems including the role of multi-sided platforms and the behavioral economics of payments,
- understand the main drivers of adoption and usage of (new) payment instruments by consumers and merchants,
- discuss the impact of key innovations (FinTech, virtual currencies, blockchain, instant payments, mobile money, Google Wallet, Apple Pay, Uber) on the international payment landscape,
- assess the critical factors for effective competition policy and consumer protection.

Inhoud vak
Payment economics lies at the intersection of banking, monetary theory, and industrial organization. Tapping from these areas, this course examines a "workhorse" model suited for analyzing the economic incentives of payment behavior. The focus is on retail payments rather than wholesale. Economic design, pricing, competition, regulation, and innovation will be studied within this economic (multi-platform) framework. Network effects are also important, and their role – in particular in relation to innovation – will be analyzed.

The payments industry is going through a period of significant change. Innovation is creating new opportunities, but also risks, for payment providers. New (non-bank) players introducing new technologies are attempting to get a piece of the "payment pie". In particular, Bitcoin and its ‘blockchain’ algorithm has tapped a nerve in the financial ecosystem. What does this mix of entry, innovation and regulation mean for the future of payments?

The course will broadly consist of four parts:
1. Industrial organization and economics of payment systems
2. Empirical validation of payment models
3. Competition policy and regulation of payments
4. Key innovations in payments and future landscape

Onderwijsvorm
Lecture

Toetsvorm
Written interim examination, open questions, closed book

Literatuur
Papers to be announced

Empirical Finance

Vakcode	E_FIN_EF (60442070)
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	School of Business and Economics
Coördinator	prof. dr. A. Lucas
Examinator	prof. dr. A. Lucas
Docent(en)	prof. dr. A. Lucas, dr. A. Opschoor
Lesmethode(n)	Hoorcollege, Casecollege, Werkcollege
Niveau	400

Doel vak
The student is able to:
1) translate a financial research question into a modelling equation that can be operationalized for statistical or mathematical analysis.
2) Apply various empirical models and methods - ranging from linear regression, maximum likelihood, time series models and forecasting – on empirical data, using statistical software
3) Report the results of his/her analysis clearly according to academic standards.

Inhoud vak
The course concentrates on the following methodologies: regression model, endogeneity and instrumental variables, time series models, tests for information efficiency, market microstructure, credit risk, event study analysis, portfolio valuation, fixed income, volatility models (GARCH), switching models, forecasting.
This course offers students the opportunity to study advanced empirical research methods in finance. The objective is to increase the students' ability to understand and to apply empirical methods in finance. The course represents an integration of theory, methods and examples. We use STATA as our standard software. The aim of the course is to enable students to undertake their own quantitative research projects in practice.

Onderwijsvorm

The first week there is an introductory computer lab session to get familiar with the software used in class, STATA. There are two lecture sessions each week for six weeks. Next to this, there is a lab session each weak in smaller groups.
The programme consists of lectures, classroom discussions, case work, and computer exercises. Students are expected to actively participate in all classroom discussions. The purpose of the compulsory case work is to give students the practical skills for solving empirical finance problems.

Toetsvorm
There is a final written exam (70 percent; minimum grade 5.0 to pass the course).
There case work during the course (30 percent).

Literatuur
Book: Introductory Econometrics for Finance, 2nd Edition, Chris Brooks, Cambridge University Press.
Slides and lecture notes.
Relevant academic papers (to be indicated at the start of the course).

Vereiste voorkennis
Students should have a sound knowledge of introductory mathematics (including linear algebra) and statistics at the bachelor economics level and be familiar with key concepts of corporate finance, investments and financial markets.

Indication of entry level:
Sydsaeter and Hammond (2006, Prentice Hall): Essential Mathematics for Economic Analysis.
Business Statistics Berenson, Levine, Krehbiel (2002): Basic Business Statistics.
Brealey and Myers (2002): Principles of Corporate Finance, 7th ed.
Bodie, Kane, and Marcus (1996): Investments.

Aanbevolen voorkennis
Core courses Advanced Corporate Finance (4.1) and Asset Pricing (4.1).

Doelgroep
MSc Finance

Financial Markets and Institutions

Vakcode	E_FIN_FMI (60442080)
Periode	Periode 2
Credits	6.0
Voertaal	Engels
Faculteit	School of Business and Economics
Coördinator	prof. dr. I.P.P. van Lelyveld
Examinator	prof. dr. I.P.P. van Lelyveld
Docent(en)	prof. dr. I.P.P. van Lelyveld
Lesmethode(n)	Hoorcollege
Niveau	400

Doel vak
The purpose of this course is to develop an understanding of the economics underlying financial intermediation, financial markets and banking, with a particular regard for current market developments and their consequences.

Inhoud vak
We start by very briefly discussing the traditional role of commercial banks in the
financial system and how banks manage risks. Given that Finance track students this year will have studied most of this in the Bachelor course FMI, this coverage will be high over.

Given the depth of the Great Financial Crisis (2007-2009), there has been a flurry in new regulation. What are the objectives of these regulations, are these or will these be met. Since traditionally regulation has been focussed on solvency will dedicate a lecture on liquidity as well as this has proven to be quite a separate type of risk. In addition we will discuss macroprudential and systemic risk regulations.

The next two lectures cover the plumbing of the system and other large institutional participants. The former lecture will provide us some understanding of how risks in the system not only originate with the actions (i.e., trades) but also with the markets are set up. The latter will discuss how, next to (investment) banks, other large institutional investors are coming to the fore.

In the final part of the course we will turn to three distinct markets: the derivatives market, the interbank and the international banking market. How do these markets operate, particularly in the crisis, and how are they evolving.

Two guest lectures from practitioners will provide more colour: DNB President Klaas Knot will cover central bank policy complemented by a lecture from a practitioner.

Onderwijsvorm
The lectures will be complemented by a writing assignment (see below)
All information regarding the timetable of the course can be found at http://rooster.vu.nl.
To facilitate the Writing Assignment a non-compulsory lecture on writing in English will be organised in the second week.
In the second week there will be an additional non-compulsory lecture to discuss question for those without a banking background
(e.g. econometrics students).
Question should be raised on the web forum.

Toetsvorm
Final grade is based on a closed-book written final exam (80%)
and the grade on an open-book essay to be written in groups of at most three students (20%). More details regarding the topics and the structure of the essay will be provided during the lectures and tutorials. If no essay was submitted, it will be graded 0 (zero), counting as a 0 for the resit as well. In the
case of a resit in later periods (i.e., in 2018 or later), the essay result will be disregarded and the resit grade will be based 100% on the

examination. The exam questions will cover the topics and the exercises treated in the class. The lecture notes and solutions published on Canvas can be used as a faithful guide for the required material and level of difficulty.
Part of understanding is being able to present your findings. In many cases, getting the form right is just as important as the actual content. Findings can be presented in many ways. For example, as an academic article, a thesis, a Powerpoint or a column. In this writing assignment we will aim for a contribution to a policy oriented blog such as VoxEU (www.voxeu.org). See www.voxveu.org for last year's submissions.
Last year the topic was the future of banking. Closer to the course, we will set the
topic for this year´s assignment.
The assignment should be written in groups of at most three. Please use the appropriate sign up tool on Canvas. Further details will be given in the first lecture. Note that a non-compulsory lecture on writing in English will be planned in the first week.
The deadline for the assignment will be announced in the first lecture.

Literatuur
The material from the Bachelor course FMI will be assumed as starting level. For those wishing to brush up, please go over all of Chapters 8 through 12 from
• Mishkin, F., K. Matthews, and M. Giuliodori, The Economics of Money, Banking and Finance, European edition.

Several mandatory academic papers will posted to Canvas
Lecture notes will be available on Canvas just before each class.
Solutions for all exercises will be available after lectures.
Other non-mandatory (but useful) materials such as academic papers, press articles or book titles will be posted on Canvas.

Vereiste voorkennis
Students should have followed a bachelor course in Money and Banking.

Financial Sector Regulation

Vakcode	E_BA_FSR ()
Periode	Periode 1
Credits	6.0
Voertaal	Engels
Faculteit	School of Business and Economics
Coördinator	prof. dr. S.G. van der Lecq
Examinator	prof. dr. S.G. van der Lecq
Docent(en)	prof. dr. S.G. van der Lecq
Lesmethode(n)	Hoorcollege
Niveau	400

Overige informatie
This course will not be lectured anymore from 2017-2018. For students who have attended the course 2016-2017 or earlier, but have not successfully completed the course, a transitional regulation is valid. At the introduction page of this study guide you will find an overview of transitional arrangements. In order to pass the course subscribing to

the course in VUnet is necessary. The course description (including literature) can be found in last year's study guide.

Institutional Investments and Asset Liability Management

Vakcode	E_FIN_IIALM ()
Periode	Periode 4
Credits	6.0
Voertaal	Engels
Faculteit	School of Business and Economics
Coördinator	dr. M. Boes
Examinator	dr. M. Boes
Docent(en)	dr. M. Boes
Lesmethode(n)	Hoorcollege, Werkgroep
Niveau	400

Doel vak
This course has a dual objective:

1. Students should achieve advanced knowledge of the investment process of institutional investors, like pension funds, and the concept of balance sheet management (ALM: Asset and Liability Management)

2. Students should acquire a thorough knowledge of the developments in fixed income space, in particular the recent advances in the pricing of fixed income derivatives like swaps and swaptions

After following this course, you:
- Have a thorough understanding of the theory of strategic dynamic asset allocation (SAA) and Asset Liability Management (ALM) and its implementation by institutional investors
- Have a thorough understanding of basic fixed income instruments such as (inflation) swaps and swaptions and their strategic use by institutional investors
- Have an overview of the practical implemenation of ALM studies in the financial industry
- Have an up-to-date knowledge on the recent developments in the regulation of derivatives markets
- Have a sound understanding on how linear and non-linear derivatives are used by pension funds in their balance sheet management
- Have knowledge on how pension funds decide on the management of currency risk, benchmark choice, and mitigation measures for counterparty credit risk

Inhoud vak
Week 1: a broad introduction to pension funds. Specifically, we give an overview of the Dutch pension system, some basic definitions, and the regulatory framework. In addition to that, the investment problem of a pension fund is explained and subsequently linked to the investment decision problems that were treated in earlier courses. Also in week 1, we give an introduction to interest rate risk on the balance sheet of institutional investors.

Week 2 and 3: focus on fixed income derivatives: which instruments are available, how do they work, how to price, what are the risks and which

tools are available to manage those risks? The approach taken won't be purely theoretical, we'll have a clear focus on the practical usage of fixed income derivatives.

Week 4 and 5: focus on strategic asset allocation for institutional investors. We give both an academic and an applied treatment of this problem. We won't solely focus on interest rate risk management but will also look at the practical consequences of strategic choices on equity investing and currency hedging.

Week 6: we'll organize a guest lecture in this final week and we'll also have the presentation session resulting from the second case.

In this course we work closely together with Ortec Finance. Consequence is that we'll be able to establish a strong link between academic theory and practical application.

Onderwijsvorm
Lectures (2 times 2 hours per week) and a weekly working class (2 hours)

Toetsvorm
- Written exam;
- Two cases;
- Cases count for 20% of final grade;
- Participation in the cases is mandatory: if students do not participate, they cannot pass for the course

Literatuur
- Hull: Options, Futures and Other Derivatives (8th Edition)
- Additional course material (e.g. academic papers) will be provided on Canvas

Overige informatie
This course brings students up to date with the recent developements in the field of fixed income derivatives and institutional investments. To do so efficiently, the course builds on earlier courses.

Internship MSc Finance

Vakcode	E_FIN_INTFIN ()
Periode	Ac. Jaar (september)
Credits	0.0
Voertaal	Engels
Faculteit	School of Business and Economics
Coördinator	prof. dr. R.C.J. Zwinkels
Examinator	prof. dr. R.C.J. Zwinkels
Niveau	400

Doel vak
An internship is an excellent way to apply the knowledge and (academic) skills which students acquire during their studies. For this reason it is highly recommended. The most important learning goal of internships is to familiarize with professional and market-related skills in a real and new organizational environment. With the job market becoming increasingly competitive, gaining relevant experience will give students

a good start into their professional career. The Master Internship 0 EC course is available for all master programmes. Students can do an internship parallel to their study or after completion of all courses. Since the internship will appear on the student's grade list, this requires some sort of assessment.

Toetsvorm
Prof. dr. Vorst (a.c.f.vorst@vu.nl) is the coordinator of the 0 EC internships. He will appoint an SBE-supervisor for your internship. Students who want their internship to appear on their grade list need to fulfill the following requirements: 1. Internship proposal by the student 2. An internship report after completion of the internship We will elaborate on these requirements below. 1. Internship proposal by the student (max. 3 A4) Main purpose of the internship proposal is a description of what the student intends to learn during the internship. The proposal includes the following elements: - Describe the organization and the department where the internship is located (for instance, sector, age of the organization, number of employees, etc.); - a description of your internships tasks and responsibilities; - personal learning objectives: what do you intend to learn from this internship?; - describe why the internship is relevant for your study programme. The internship proposal should be submitted to prof. dr. Vorst by email (a.c.f.vorst@vu.nl). 2. Internship report (max. 5 A4) Main purpose of the internship report is a description of what the student has learned during the internship. The proposal includes the following elements: - description of the internship (i.e. goal, activities, results); - a personal reflection on the internship (i.e., the supervision by the organization providing the internship, the working atmosphere, comparison of expectations and realizations, etc.); - reflection on your personal learning objectives. Your SBE supervisor checks whether the student has met the requirements and subsequently sends a confirmation to the study administration.

Intekenprocedure
The internship proposal should be submitted to prof. dr. Vorst by email (a.c.f.vorst@vu.nl). He will appoint an SBE supervisor for your internship. To be sure that you will get credits for the internship, your SBE supervisor has to approve your internship proposal. The internship proposal has to be discussed at least four weeks before the start of your internship. Make an appointment for this with your SBE supervisor. At least 48 hours before that appointment, you need to e-mail the internship proposal to the SBE supervisor. Please note that students don't have to register for this course through VUnet. The SBE Office of Career Services can help you prepare for your internship, for instance when it comes to writing a good resume and application letter, or discussing what kind of internship is right for you. For more information, see https://careerservices.sbe.vu.nl/en/

Overige informatie
Doing an internship is suitable for EU-students. When you are a non-EU student please contact the SBE Career Office. The course manual can be found on the general Canvas page for your programme.

Macro and International Finance

Vakcode	E_FIN_MIF ()
Periode	Periode 4

Credits	6.0
Voertaal	Engels
Faculteit	School of Business and Economics
Coördinator	prof. dr. A.J. Menkveld
Examinator	prof. dr. A.J. Menkveld
Docent(en)	prof. dr. A.J. Menkveld
Lesmethode(n)	Hoorcollege
Niveau	400

Doel vak
The goals of this course are:

- to gain a thorough understanding of the role of financial markets in the macro-economy and international capital flows.
- to develop a critical attitude towards competing theories in macro-finance.
- develop skills to answer macro-finance questions using advanced statistical analyses.

Inhoud vak
Macro-finance addresses the link between asset prices and economic fluctuations. Potential topics that will be discussed in this course include:
- consumption based asset pricing models
- exchange rate models
- finance and growth
- foreign direct investments and portfolio investments
- monetary policy

Onderwijsvorm
In each of the six weeks of this period:
- 2 * 2 hours lecturing
- 1 * 2 hours tutorial

Toetsvorm
The final grade consists of a written exam (min. 5.0) and assignments.

Literatuur
Selection of academic articles.

Aanbevolen voorkennis
Students are strongly advised to have bachelor level knowledge of Investments (Bodie, Kane, and Markus: Investments, McGraw-Hill), Macro-economics, and Statistics.

Doelgroep
Students in Master Finance, Master Economics, Master Business Administration - Financial Management.

Portfolio Finance

Vakcode	E_BA_PTFIN ()
Periode	Ac. Jaar (september)
Credits	0.0

Voertaal	Engels
Faculteit	School of Business and Economics
Coördinator	dr. M.B.J. Schauten
Lesmethode(n)	Hoorcollege, Werkgroep

Quantitative Financial Risk Management

Vakcode	E_FIN_QFRM (60422110)
Periode	Periode 4
Credits	6.0
Voertaal	Engels
Faculteit	School of Business and Economics
Coördinator	dr. S.A. Borovkova
Examinator	dr. S.A. Borovkova
Docent(en)	dr. S.A. Borovkova, dr. A. van Haastrecht
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	400

Doel vak
Deep understanding and ability to implement modern quantitative risk measurement and management techniques, in the areas of market, operational and liquidity risk.

Inhoud vak
The lecturers are Dr. S. Borovkova, an expert on derivatives and quantitative risk
management. We will focus on financial risks facing corporations and financial institutions, such
as market, liquidity and operational risks (note that credit risk is handled in a separate course Credit, Complexity and Systemic Risk). The course will encompass both
theoretical and applied aspects of risk management. This course will give you a solid fundamental for measurement and management of financial risks, knowledge of newest quantitative methods and the ability to apply your knowledge in corporate environment. The lectures are complemented by practical assignments designed to maximally match actual risk management applications in banking environment. For this course you need a strong quantitative focus and affiliation with statistics and probability as well as (some) affiliation with finance, or an intention to learn necessary concepts and vocabulary.

Onderwijsvorm
Lectures (4 hours per week) and practice sessions (2 hours a week)

Toetsvorm
2 practical assignments and written exam

Literatuur
Embrechts, Frey and McNeal "Quantitative Risk Management"

Aanbevolen voorkennis
Introductory statistics and probability, implementation skills (Matlab, R, Python or any other computer package)

Real Estate Management

Vakcode	E_BA_REM (61452040)
Periode	Periode 5
Credits	6.0
Voertaal	Engels
Faculteit	School of Business and Economics
Coördinator	prof. dr. J. Rouwendal
Examinator	prof. dr. J. Rouwendal
Docent(en)	prof. dr. J. Rouwendal, dr. F. Hamelink
Lesmethode(n)	Hoorcollege
Niveau	400

Doel vak
The course provides an introduction to the understanding and the analysis of real estate markets and the investment alternatives available to both debt and equity investors. A large part of the focus will be on residential real estate. Students study both the owner occupied and rental markets and pay particular attention to financial aspects, in particular the mortgage market. The secondary market for mortgages, where institutional investors invest in pools of mortgages, is analysed in detail, in particular in light of the recent financial crisis. The last part of the course deals with other forms of real estate that institutional investors may invests in. This part will cover other property types (offices, commercial real estate, etc.) and investment vehicles, such as REITS. Although the course takes an international perspective, special attention is given to the Dutch situation.

Inhoud vak
Students study the characteristics of mortgage loans used by households to finance the purchase of a house, the functioning of the Dutch housing market including the role of policy interventions (notably mortgage interest deductibility and spatial planning), and the role of housing corporations. The secondary market for debt related to this financing is analysed with a focus on the various instruments (such as CDOs and CMOs) that have played on important role in the current financial crisis. Finally, students also look at the other side of the financing of real estate, namely, students take the perspective from an (institutional) investor, such as a pension fund, who considers real estate as one of many available asset classes. Students will study the main characteristics in terms of risk and returns of the different forms of real estate available to the investor (such as investing in mortgage pools, investing in buildings, securitised real estate, etc.), as well as by property type (such as residential versus commercial real estate).
After following this course, students should be able to understand:
• the main characteristics of the most popular types of mortgage loans;
• the pros and cons of fixed rate and adjustable rate mortgages;
• the impact of fiscal measures on mortgage payments;
• the role of the housing corporations on the Dutch rental housing market;
• the importance of the secondary market in mortgages, as well as the available instruments for institutional investors such as pension

funds;
• the risk and returns characteristics of the main investments vehicles in real estate available to an institution investor.

Real Estate Management is a joint effort of the departments of Spatial Economics and Finance.

Onderwijsvorm
Lectures, including a guest lecture by a real estate specialist.

Toetsvorm
Written examination. Duration 2 h and 45 min. Open questions. No interim results.

Literatuur
• Baum, A.E. & Hartzell, D. (2011). Global Property Investment: Strategies, Structures, Decisions. Wiley-Blackwell, ISBN: 978-1-4443-3528-6, Paperback, 576 pages;
• additional course material, mainly academic papers, that will be provided on Canvas.

Research Project for Finance

Vakcode	E_FIN_RPFIN (60432010)
Periode	Periode 3
Credits	6.0
Voertaal	Engels
Faculteit	School of Business and Economics
Coördinator	dr. J.A.F. Schnitzler
Examinator	dr. J.A.F. Schnitzler
Docent(en)	prof. dr. A. Lucas, dr. S.A. Borovkova, dr. G. Tumer Alkan, dr. M. Millone MSc, dr. T. Artiga Gonzalez, prof. dr. A.C.F. Vorst
Lesmethode(n)	Werkgroep
Niveau	400

Doel vak
1. Disciplinary knowledge. Students know the main defining principles, methodological cornerstones, and tools in the discipline and possess applicable knowledge to analyze complex questions in corporate finance, investments / asset pricing and institutional finance
2. Analytical thinking
a. Critical reading and judgement. Students are able to search, identify, read and understand the relevant academic literature in the area of finance and critically assess academic research.
b. Abstraction in complex settings. Students are able to abstract complex realistic problems in finance to their core, formulate precise research questions and hypotheses, and create their own frame of analysis to address the research question.
3. Quantitative skills. Students possess the quantitative analysis skills to answer complex research questions in the area of finance; they are able to select the appropriate quantitative techniques for analysis, gather empirical data from financial databases, manipulate large data sets, efficiently use statistical software to perform the analysis and critically interpret estimation results.

4. Professional skills
a. Professional independence and Communication. They have the ability to work and plan a demanding project on a tight time-line, both individually and in teams; they are able to communicate effectively (report the research set-up and findings clearly, both orally and in writing) and in a balanced way to a variety of audiences (professionals, non-experts).
b. Societal awareness. Students possess the skills to identify new relevant questions in the area of finance; they are able to put these questions into societal context.
c. Reflection. Students have the ability to self-reflect, to critically assess their own (and others) output and performance, and to improve upon this where needed; formulate issues and/or research questions that lie beyond (or after) the research question at hand and thus contribute to further knowledge creation.

Inhoud vak
Before the end of Period 2, students will be requested to form groups and make a choice from a provided list of projects. This will be communicated via Canvas and VU-email. Each project includes a detailed description, allowing the students to have some understanding of the implications of the topic. The projects will cover various areas in finance; corporate finance, investments / asset pricing and institutional finance. A few projects requiring a strong background in econometrics will also be provided for participants of the Quantitative Finance Track. Starting references from the relevant academic literature will be provided, but students should actively look for additional relevant literature. Between the end of Period 2 and the beginning of this course in January (period 3), students will prepare an initial set-up for their project and carry out a preliminary literature review on their subject. They will present this set-up to the other students in class during the start of period 3. The actual research can then go ahead at full speed during the actual four weeks of period 3. During this initial preparation period, as well as during period 3, individual meetings with the lecturer can be organized. During period 3, each group will be required to:
- make an concise initial, kick-off presentation
- make an intermediate presentation to all other groups
- make a final presentation to all other groups at the end of the period
- write up a research paper (usually around 40 pages), written as a scientific paper, presenting their research, which includes the literature overview and the empirical findings. Writing style and layout should follow those of one of the major academic Finance journals (Journal of Finance, Journal of Financial Economics, Review of Financial Studies).
Students are encouraged to strengthen their applied research outcomes by input from practitioners from the financial industry.

Onderwijsvorm
- individual meetings with each group
- three plenary sessions for presentations of research set-up and (intermediate) results

Toetsvorm
The course grade is based on the final report, the presentation of the results, and the student’s discussion participation (as a discussant of one of the presented projects, as well as for his/her contribution to the discussion in the plenary sessions).

Literatuur
A literature review is required for each project. Starting references from the relevant academic literature are provided by the supervisor.

Vereiste voorkennis
For Finance students, the material of Empirical Finance. For Quantitative Finance Track students, we require knowledge of Advanced Econometrics. All projects require students to work with real life data, for which students may choose an appropriate software package of their liking (Excel, or more sophisticated econometric / statistical software) and appropriate available databases (Datastream, SDC, CRSP, Compustat, ...) or proprietary data sources.

Stochastic Proces for Finance

Vakcode	E_FIN_SPF ()
Periode	Periode 1+2
Credits	6.0
Voertaal	Engels
Faculteit	School of Business and Economics
Coördinator	dr. S.A. Borovkova
Examinator	dr. S.A. Borovkova
Lesmethode(n)	Hoorcollege, Werkcollege
Niveau	400

Doel vak
The goal of this course is to provide a deep understanding of the theory of stochastic processes and change of measure, for derivatives valuation, simulation and other quantitative finance applications. Another goal is to develop practical (implementation) skills to apply the knowledge in a working environment.

Inhoud vak
This course is an introduction in stochastic processes and their application in finance. The purpose
is to introduce fundamental concepts underlying arbitrage theory and martingale approach with
the emphasis on practical applications in derivative pricing.
The course starts with such notions as stochastic process, the flow of information, filtration,
martingale, self-financing portfolio, arbitrage, replication/hedging, complete markets, Brownian
motion, Itô calculus, Feynman-Kac theorem, change of measure and Girsanov theorem.
These concepts will be used to study European and American options, Forward contracts,
Exotic options, zero coupon and swap pricing, and will be extended to interest rate models to
price interest rate derivatives.
The lecturers are Prof. Artem Tsvetkov, head of quant team of ING, and Dr Svetlana Borovkova, an expert on derivatives and quantitative risk management. Two guest lectureres from finance industry will also participate in the course.

Onderwijsvorm
Lectures (2 hours per week) and practical sessions (2 hours a week)

Toetsvorm
Written midterm test, written exam and three computer assignments

Literatuur
Main: Björk, Arbitrage theory in continues time [1].
Additional: S. Shreve, Stochastic calculus for finance [2, 3]
Scientific articles: Dupire [4], Heston [5], SABR [6],
Longstall–Schwartz [7].
Software: Matlab is used for computer practical and assignments.

Vereiste voorkennis
Introductory probability theory, Analysis

Doelgroep
Quantitative Risk managmenet MSc honours students, Finance and Stochastics MSc students, Business Analytics MSc students interested in quant finance

Thesis MSc Duisenberg QFRM

Vakcode	E_FIN_THSQFD ()
Periode	Ac. Jaar (september)
Credits	21.0
Voertaal	Engels
Faculteit	School of Business and Economics
Coördinator	prof. dr. A.C.F. Vorst
Examinator	prof. dr. A.C.F. Vorst
Niveau	500

Overige informatie
This course will not be lectured anymore from 2017-2018. For students who have attended the course 2016-2017 or earlier, but have not successfully completed the course, a transitional regulation is valid. At the introduction page of this study guide you will find an overview of transitional arrangements. In order to pass the course subscribing to the course in VUnet is necessary. The course description (including literature) can be found in last year’s study guide.

Thesis MSc Finance

Vakcode	E_FIN_THS ()
Periode	Ac. Jaar (september)
Credits	18.0
Voertaal	Engels
Faculteit	School of Business and Economics
Coördinator	prof. dr. A.C.F. Vorst
Examinator	prof. dr. A.C.F. Vorst
Lesmethode(n)	Hoorcollege

Niveau	500

Doel vak
The thesis is an important part of your academic training where all the previous elements come together: knowledge, skills, attitude, and creativity. The thesis gives you the opportunity to engage in your own independent academic research and to give your distinctive `signature' of what you are up to in a relatively short period of time. This can be a valuable signal towards the labor market.

Inhoud vak
You are going to define your own research project and subsequently go through all necessary steps like: gathering literature, getting a sharp research question, gathering and manipulating data, choosing the right empirical methodology and getting results, interpreting them, doing robustness checks and writing down everything crisply and concisely, and being able to communicate effectively about your results.

Onderwijsvorm
You will work on your own and will be supervised by one of the members of the department of Finance. You will have regular meetings with your supervisor

Toetsvorm
Your thesis will be assessed by your supervisor and a second reader

Literatuur
Academic papers from the top academic finance journals, dependent on your research question

Vereiste voorkennis
At least two core courses and the Research Project should be passed

Intekenprocedure
Students should sign up in time according to the manual, which is available on Canvas.

Overige informatie
You can write your thesis in two periods: either in Spring or in Fall.
There are entry requirements: two core courses passed and the Research Project.

Thesis MSc Finance - Duisenberg HP

Vakcode	E_FIN_THSHT ()
Periode	Ac. Jaar (september)
Credits	18.0
Voertaal	Engels
Faculteit	School of Business and Economics
Coördinator	prof. dr. A.C.F. Vorst
Examinator	prof. dr. A.C.F. Vorst
Niveau	400

Doel vak
The thesis is an important part of your academic training where all the previous elements come together: knowledge, skills, attitude, and creativity. The thesis gives you the opportunity to engage in your own independent academic research and to give your distinctive `signature' of what you are up to in a relatively short period of time. This can be a valuable signal towards the labor market.

Inhoud vak
You are going to define your own research project and subsequently go through all necessary steps like: gathering literature, getting a sharp research question, gathering and manipulating data, choosing the right empirical methodology and getting results, interpreting them, doing robustness checks and writing down everything crisply and concisely, and being able to communicate effectively about your results.

Onderwijsvorm
You will work on your own and will be supervised by one of the members of the department of Finance. You will have regular meetings with your supervisor

Toetsvorm
Your thesis will be assessed by your supervisor and a second reader

Literatuur
Academic papers from the top academic finance journals, dependent on your research question

Vereiste voorkennis
To be able to start with your thesis in Spring in the DHPQRM you need to have passed by mid January two out of the four core courses from the Fall semester (Stochastic Processes for Finance, Asset Pricing, Econometrics for QRM or Advanced Econometrics, Derivatives). In addition, you need to pass the Research Project 4.3 with a grade of at least 6.0. To start in Fall of the next academic year, you should have passed the Research Project 4.3 (with grade 6.0 or higher) and two out of the six core courses.

Intekenprocedure
Students should sign up in time according to the manual, which is available on Canvas

Overige informatie
To be able to start with your thesis in Spring in the DHPQRM you need to have passed by mid January two out of the four core courses from the Fall semester (Stochastic Processes for Finance, Asset Pricing, Econometrics for QRM or Advanced Econometrics, Derivatives). In addition, you need to pass the Research Project 4.3 with a grade of at least 6.0. To start in Fall of the next academic year, you should have passed the Research Project 4.3 (with grade 6.0 or higher) and two out of the six core courses.

Time Series Econometrics

Vakcode	E_EORM_TSE (64432000)
Periode	Periode 4
Credits	6.0

Voertaal	Engels
Faculteit	School of Business and Economics
Coördinator	prof. dr. S.J. Koopman
Examinator	prof. dr. S.J. Koopman
Lesmethode(n)	Hoorcollege
Niveau	400

Doel vak
To gain insights in economic and financial time series modelling with a focus on theory, methods and computations.

Inhoud vak
This course focuses on theory, methodology and computational methods for a general class of time series state space models
The econometric methodology is explored in detail for a number of selected topics in the time series analysis of economic and financial data.
In particular, dynamic model properties, model formulations, likelihood evaluations, signal extraction and Monte Carlo simulation methods are studied.
Theory and methods are developed in detail: derivations are studied which all start from basic principles in statistics and econometrics.
Various computer programs need to be developed for the implementation of the methods.

Onderwijsvorm
lectures
tutorials

Toetsvorm
written exam
written assignments

Literatuur
Selection of literature:
- Brockwell, P.J. & R.A. Davis, Time Series: Theory and Methods. Second Edition, Springer-Verlag, 1991.
- Durbin, J. & S.J. Koopman, Time Series Analysis by State Space Methods. Second Edition, Oxford University Press, 2012.
- Selected papers.