



Finance (MSc)

VU University Amsterdam - Fac. der Economische Wet. en Bedrijfsk. - M Finance - 2015-2016

The Master's programme in Finance is an intensive yet flexible programme which is geared towards corporate, institutional and governmental financial management, focusing on the functioning of international financial markets. After an advanced and comprehensive introduction to the various areas of finance, the student can specialise in his own field of interest, ranging from corporate financial management to quantitative asset management. After completion, the student will have developed into an academic financial specialist with a keen interest in financial economics, solid analytical skills, and a multidisciplinary outlook.

Read the [full description](#) of the programme or use the schedule below for information on the individual courses in the programme.

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ABRI Honours Programme

M Finance

Courses:

Name	Period	Credits	Code
Advanced Corporate Finance	Period 1	6.0	E_FIN_ACF
Asset Pricing	Period 1	6.0	E_FIN_AP
Bank Management	Period 4	6.0	E_BA_BANKM
Behavioral Corporate Finance	Period 4	6.0	E_FIN_BCF
Corporate Valuation for Finance	Period 2	6.0	E_FIN_CVF
Derivatives	Period 2	6.0	E_FIN_DER
Empirical Finance	Period 2	6.0	E_FIN_EF
Financial Markets and Institutions	Period 4	6.0	E_FIN_FMI
Institutional Investments and ALM for Finance	Period 4	6.0	E_FIN_IIALMF
Quantitative Financial Risk Management	Period 5	6.0	E_FIN_QFRM
RABO Honours Class	Period 4+5	9.0	E_FIN_RHC
Real Estate Management	Period 5	6.0	E_BA_REM
Research Project for Finance	Period 3	6.0	E_FIN_RPFIN
Thesis	Ac. Year (September)	18.0	E_FIN_THS

M Finance - Duisenberg HP QRM

Programme components:

- [M Finance - Duisenberg QRM - Electives](#)
- [M Finance - Duisenberg QRM - Obligatory](#)

M Finance - Duisenberg QRM - Electives

Courses:

Name	Period	Credits	Code
Advanced Corporate Finance	Period 1	6.0	E_FIN_ACF

Behavioral Corporate Finance	Period 4	6.0	E_FIN_BCF
Corporate Law DSFMR	Period 4	6.0	E_BA_CL
Corporate Valuation	Period 2	6.0	E_BA_CV
Data Mining Techniques	Period 5	6.0	X_400108
Evolutionary Computing	Period 1	6.0	X_400111
Real Estate Management	Period 5	6.0	E_BA_REM
Simulation and Stochastic Systems	Period 4	6.0	E_EORM_SSS
Strategic and Cooperative Decision Making	Period 2	6.0	E_EORM_SCDM
Time Series Econometrics	Period 4	6.0	E_EORM_TSE

M Finance - Duisenberg QRM - Obligatory

Courses:

Name	Period	Credits	Code
Asset Pricing	Period 1	6.0	E_FIN_AP
Derivatives	Period 2	6.0	E_FIN_DER
Econometrics for Quantitative Risk Management	Period 1+2	6.0	E_FIN_EQRM
Ethics	Period 3	3.0	E_BA_ETH
Financial Sector Regulation	Period 4	6.0	E_BA_FSR
Institutional Investments and ALM for Finance	Period 4	6.0	E_FIN_IIALMF
Internship	Ac. Year (September)	6.0	E_FIN_INTFD
Quantitative Financial Risk Management	Period 5	6.0	E_FIN_QFRM
Research Project for Finance	Period 3	6.0	E_FIN_RPFIN
Stochastic Processes for Finance	Period 1+2	6.0	X_400352
Thesis	Ac. Year (September)	21.0	E_FIN_THSQFD

M Finance - Quantitative Finance

Programme components:

- Master Finance - Honours Track Quantitative Finance Electives A
- Master Finance - Honours Track Quantitative Finance Electives B
- Master Finance - Honours Track Quantitative Finance Obligatory courses

Master Finance - Honours Track Quantitative Finance Electives A

Courses:

Name	Period	Credits	Code
Advanced Corporate Finance	Period 1	6.0	E_FIN_ACF
Behavioral Corporate Finance	Period 4	6.0	E_FIN_BCF
Corporate Valuation for Finance	Period 2	6.0	E_FIN_CVF
Financial Markets and Institutions	Period 4	6.0	E_FIN_FMI
Institutional Investments and ALM for Finance	Period 4	6.0	E_FIN_IIALMF
Real Estate Management	Period 5	6.0	E_BA_REM

Master Finance - Honours Track Quantitative Finance Electives B

Courses:

Name	Period	Credits	Code
Advanced Algorithms	Period 1+2	6.0	E_EORM_AA
Advanced Financial Reporting	Period 1	6.0	E_ACC_AFR
Advanced Macroeconomics	Period 2	6.0	E_EC_AMAEC
Asymptotic Statistics	Period 1+2	8.0	X_400323
Corporate Governance, Risk Management and Control	Period 5	6.0	E_ACC_CGRMC
Corporate Law	Period 4	6.0	E_ACC_CL
Data Mining Techniques	Period 5	6.0	X_400108
Empirical Research in Accounting	Period 1	6.0	E_ACC_ERA
Evolutionary Computing	Period 1	6.0	X_400111
Globalization, Growth and Development	Period 4	6.0	E_EC_GGD
Simulation and Stochastic Systems	Period 4	6.0	E_EORM_SSS
Stochastic Optimization	Period 1+2	6.0	X_400336
Strategic and Cooperative Decision Making	Period 2	6.0	E_EORM_SCDM

Master Finance - Honours Track Quantitative Finance Obligatory courses

Courses:

Name	Period	Credits	Code
Advanced Econometrics	Period 1+2	6.0	E_EORM_AECTR
Asset Pricing	Period 1	6.0	E_FIN_AP
Derivatives	Period 2	6.0	E_FIN_DER
Quantitative Financial Risk Management	Period 5	6.0	E_FIN_QFRM
Research Project for Finance	Period 3	6.0	E_FIN_RPFIN
Stochastic Processes for Finance	Period 1+2	6.0	X_400352
Thesis	Ac. Year (September)	24.0	E_FIN_QFTHSS
Time Series Econometrics	Period 4	6.0	E_EORM_TSE

Advanced Algorithms

Course code	E_EORM_AA ()
Period	Period 1+2
Credits	6.0
Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	dr. ir. R.A. Sitters
Examinator	dr. ir. R.A. Sitters
Teaching method(s)	Lecture
Level	400

Course objective

In this course you will learn how to develop efficient algorithms for solving fundamental optimization problems with applications in routing, network design and scheduling. The objectives of the course are to:

- get to know models to capture different types of optimization problems (offline, online, distributed)
 - learn basic and advanced techniques to solve such optimization problems (primal-dual schema, randomized rounding, iterative rounding, potential functions, local search, etc.)
 - use these techniques to design efficient algorithms
- study the computational complexity of optimization problems

Course content

Some of the topics that will be covered in the course are:

- Facility location problems, scheduling problems, network routing, congestion games, network design
- Local search algorithms, online algorithms, randomized algorithms, approximation algorithms.
- Computational complexity and hardness of approximation

Form of tuition

Lectures and tutorials with take-home assignments: theory as well as Matlab programming exercises.

Type of assessment

The final grade is determined by a written exam and the assignments.

Course reading

The material to be covered in class is based on the following books. Book [1] will be used the most and is freely available for download (you may consider buying it though). The other books will be used occasionally and give a good impression of the theory.

- [1] D.P. Williamson and D.B. Shmoys, The Design of Approximation Algorithms, Cambridge University Press, 2011
- [2] V. V. Vazirani, Approximation Algorithms, Springer, 1998
- [3] C. H. Papadimitriou and K. Steiglitz, Combinatorial Optimization; Algorithms and Complexity, Prentice-Hall, 1982.
- [4] Kleinberg and E. Tardos, Algorithm Design, Addison Wesley, 2005.

Entry requirements

None. However, please see Recommended knowledge

Recommended background knowledge

Basic knowledge on algorithms, computational complexity, graph theory, linear programming, and combinatorial optimization is assumed. (The bachelor course Combinatorial Optimization (FEWEB, E_EOR3_COMB) is sufficient.) This Advanced Algorithms course is not recommended if you have very little knowledge of these subjects. A good check is to read Appendices A and B of book [1]. If this is completely new for you then this course may not be suitable. If you have any doubts please let me know.

Remarks

This course changes from year to year but it always has a substantial overlap with last year's course. See

<http://personal.vu.nl/r.a.sitters/AdvancedAlgorithms/index.html>

Advanced Corporate Finance

Course code	E_FIN_ACF ()
Period	Period 1
Credits	6.0
Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	prof. dr. ir. H.A. Rijken
Examinator	prof. dr. ir. H.A. Rijken
Teaching staff	prof. dr. ir. H.A. Rijken
Teaching method(s)	Lecture, Study Group
Level	400

Course objective

Achieve advanced knowledge in the theory and practice of corporate finance. The main objective is to fully understand theoretical concepts (their strengths and limitations) and to use these theoretical frameworks to solve in an effective way practical issues in corporate finance. After following this course, you: - understand basic Corporate Finance concepts, including their strengths and limitations - have the quantitative skills to apply these basic concepts - understand the interrelationship between various concepts and link them in a general framework - are able to apply this framework in real life cases.

Course content

This course elaborates on the course corporate finance in the bachelors program. The course has two focus areas: Corporate Security Design and Corporate (Financial) Risk Management

We will start off with a short review of the theory of Modigliani and Miller. Within the framework of these concepts we will pay attention to the issues on capital structure from the perspective of both the equity holders and the debt holders. A range of corporate financing options, like subordinated bond, convertibles and corporate securitization, will be discussed.

Thereafter we introduce comprehensively the concepts of the operational cash flow and the finance cash flow of a company. The added value of Corporate (Financial) Risk Management will be discussed from a cash flow perspective and a capital cost perspective. Links with Short Term Financial Management, Credit Risk Management and Value Based Management will be made.

Substantial attention will be given to real life cases (agency questions and restructuring cases in practice) during the course.

Form of tuition

Lectures (2 times 2 hours per week) and 3 working classes

Type of assessment

written exam (80%) and two cases (20%)

Course reading

Custom book "Advanced Corporate Finance" ISBN 9781783651931. This include a code to have (web) access to 5 online chapters from the book "Advanced Corporate Finance" (Odgen)

Entry requirements

Corporate Finance 3.2 or Corporate Financial Management 3.4. For students with no bachelor VU the admission to the Master of Finance is sufficient.

Recommended background knowledge

Corporate Finance 3.2 or Corporate Financial Management 3.4. Students with no VU bachelor in Economics or BA should be familiar with a standard textbook in Corporate Finance, like "Principles in Corporate Finance" (Brealey and Myers) or "Corporate Finance" (Berk and DeMarzo).

Advanced Econometrics

Course code	E_EORM_AECTR (64412001)
Period	Period 1+2
Credits	6.0
Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	dr. F. Blasques Albergaria Amaral
Examinator	dr. F. Blasques Albergaria Amaral
Teaching staff	dr. F. Blasques Albergaria Amaral
Teaching method(s)	Lecture, Study Group

Course objective

To gain a profound and detailed understanding of advanced econometric theory and methods. By the end of this course, participants will:

Have detailed knowledge of

- principles of econometric theory and practical methods at the graduate level
- advanced statistical concepts used in econometric theory and their application in econometric modelling

know how to

- estimate and test linear and nonlinear dynamic models
- solve theoretical and practical econometric exercises

understand

- the interplay between econometric techniques and modelling assumptions
- the proofs of asymptotic properties of important estimators and test statistics

Course content

Advanced Econometrics I

This course is devoted to advanced dynamic modeling and estimation theory for univariate stationary models. The contents covered in Advanced Econometrics I include:

Weeks 1 and 2

- Recap of linear time-series models, estimation and inference
- Formal introduction to nonlinear probability models and nonlinear stochastic processes
- Advanced topics in invertibility, stationarity, dependence, ergodicity and bounded moments

Weeks 3 and 4

- Introduction to extremum, M and Z estimators
- Existence and measurability of extremum estimators
- The general consistency theorem for extremum estimators
- Stochastic equicontinuity and uniform laws of large numbers
- Establishing identification and uniform convergence of the criterion function
- Advanced topics in estimation of nonlinear autoregressive models and nonlinear time-varying parameter models

Weeks 5 and 6

- Asymptotic normality of extremum, M and Z estimators
- Establishing the asymptotic normality of the score and the uniform convergence of the hessian
- Advanced topics in nonlinear model selection and specification
- Estimation under incorrect specification and metric selection
- Advanced topics on statistical inference under incorrect model specification

Note: the econometrics programme is currently under revision. Some topics may change. Please consult the latest version of the online study guide.

Advanced Econometrics II

This course is devoted to advanced methods for modeling multivariate non-stationary data, with special emphasis on unit-root processes and cointegration. The contents covered in Advanced Econometrics II include:

Weeks 1 and 2

- Introduction to multivariate time-series
- Advanced topics in vector autoregressive (VAR) models
- Estimation and inference for VAR models
- Marginalizing, conditioning, exogeneity and super-exogeneity

Weeks 3 and 4

- Stochastic trends and non-stationarity time series
- Characteristic equations and unit roots
- Advanced unit root tests and non-standard asymptotics

Weeks 5 and 6

- Integration and cointegration
- Advanced integration and cointegration tests
- Limit theory for cointegrated processes
- Advanced topics in vector error correction (VECM) models
- Estimation and inference for VECM models

Note: the econometrics programme is under revision. The examination format may change slightly. Please consult the latest version of the online study guide.

Form of tuition

lecture and tutorial

Some lectures can be used for students to give presentations on selected topics.

Type of assessment

Written examination.

There are two separate written exams for Advanced Econometrics I (period 1) and for Advanced Econometrics II (period 2). Minimum required result for Advanced Econometrics I is 5.5 and for Advanced Econometrics II is 5.0. Total grade for the combined 6 ECTS version is the average of the two grades and must be at least 5.5 for a pass. The two partial grades are measured in one decimal point; the total grade is the rounded average of the two grades.

Starting September 2010, the first part can be taken as a single elective course for 3 ECTS.

Note: the econometrics programme is under revision. The examination format may change slightly. Please consult the latest version of the online study guide.

Course reading

Lecture notes on "Advanced Econometrics" by F. Blasques and R. Okui.

Davidson J., "Econometric Theory", Blackwell Publishing, 2000.

Other sources:

van der Vaart A., "Asymptotic Statistics". Cambridge Series in

Statistical and Probabilistic Mathematics. Cambridge University Press, 2000.

White H., "Estimation, Inference and Specification Analysis". Econometrics Society Monographs, 1996.

Lütkepohl H., "New Introduction to Multiple Time Series Analysis", Springer, 2005.

Hamilton J. D., "Time Series Analysis", Princeton University Press. 1994.

Davidson J., "Stochastic Limit Theory". Advanced Texts in Econometrics, Oxford University Press, 1994.

B. Potscher and I.R. Prucha, "Dynamic Nonlinear Econometric Models: Asymptotic Theory". Springer-Verlag, 1997.

R. Gallant and H. White, "A Unified Theory of Estimation and Inference for Nonlinear Dynamic Models", Basil Blackwell Ltd., Oxford, 1987.

Hansen, B E, Econometrics. Manuscript, University of Wisconsin.2009.
Current URL: www.ssc.wisc.edu/~bhansen/econometrics/

Advanced Financial Reporting

Course code	E_ACC_AFR (60412050)
Period	Period 1
Credits	6.0
Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	prof. dr. C. Camfferman RA
Examinator	prof. dr. C. Camfferman RA
Teaching method(s)	Lecture, Study Group
Level	400

Course objective

This course provides an overview of the main accounting issues in preparing the financial statements of large listed enterprises (technical proficiency). In line with reporting requirements for listed companies in the European Union, the course is based on International Financial Reporting Standards (IFRS) (institutional awareness). In working with IFRS, you will learn to draw simultaneously on technical, institutional, and academic skills (problem-solving skills, compliance skills, and conceptual reasoning).

After following this course, you will be familiar with:

- the objectives of the International Accounting Standards Board (IASB) and its general approach to standard-setting;
- the IASB's Framework and its key concepts with respect to recognition, measurement and performance presentation;
- the main requirements concerning recognition and measurement of the IAS/IFRS selected for this course. This course does not deal with disclosure and presentation requirements unless specifically indicated;

- the style in which accounting standards, and specifically those of the IASB, are written.

You should then be able to:

- read and understand an accounting standard by yourself, to understand at least its main provisions concerning recognition and measurement, to summarize these in the form of journal entries and to discuss the impact of the prescribed treatments, compared to possible alternatives, on reported income and financial position;
- give a reasoned opinion on questions concerning the application of the standards covered in this course;
- recognize and explain how IFRS has been applied in practice on the basis of extracts from financial statements of listed companies;
- discuss and evaluate aspects of standards in terms of their internal consistency, consistency with other standards, their agreement with the Framework, or the overall policies of the IASB.

Course content

At the core of company financial reporting is the representation of financial position and financial performance in the balance sheet and income statement. Measuring these accounting numbers can be complex (think of uncertainty in provisions, or of financial instruments). IFRS contains extensive guidance in dealing with this complexity. In practice, IFRS can function as just a set of rules that needs to be complied with. However, it can also be seen as an evolving body of knowledge in which relevant accounting issues are identified and analyzed, and in which solutions are offered that aim to be principles-based and that are consistent with a set of underlying concepts. That is how IFRS is used in this course. We don't use a textbook, but we use IFRS to become familiar with important accounting issues, to understand how they can be resolved, and to reflect on the solutions offered in IFRS.

While the course will not turn you into an IFRS specialist, you will acquire a knowledge of issues and concepts that will allow you to follow intelligently future developments in financial reporting. You will also develop your practical skills in working with accounting standards so that you can find and apply more detailed knowledge when needed in practice or further specialized studies.

Form of tuition

Weblectures; lectures (4 hours per week); discussion classes (2 hours per week).

Type of assessment

Written exam; optional assignments yielding a maximum of 5 bonus points (out of 100 for final grade)

Course reading

IFRS International Financial Reporting Standards: Official Pronouncements issued at 1 January 2015, Part A (IFRS Foundation, 2015)

Entry requirements

This course requires intermediate knowledge of financial accounting, including preparation of consolidated financial statements. In practice, knowledge of financial accounting equivalent to Financial Accounting 3.1. is required.

Recommended background knowledge

The course assumes basic knowledge of common transactions and arrangements, such as lease contracts, pension arrangements, business combinations, and common financial instruments including derivatives.

The greater your familiarity with these topics, the easier it will be to appreciate their discussion in IFRS.

Advanced Macroeconomics

Course code	E_EC_AMAEC (60422010)
Period	Period 2
Credits	6.0
Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	prof. dr. P.A. Gautier
Examinator	prof. dr. P.A. Gautier
Teaching staff	prof. dr. P.A. Gautier
Teaching method(s)	Lecture
Level	400

Course objective

The students will be able to actively read current literature and embark on their own research projects using the knowledge gained about the analytical, mathematical, and statistical tools of modern macroeconomics. The tools include dynamic optimization, signal extraction, Nash bargaining, and the basic building blocks of DSGE models.

Course content

This course provides coverage at an advanced level of the building blocks of macroeconomics. Models of economic growth will be built up from intertemporal optimization decisions of firms and households. Special attention is given to the distribution of income (i.e. the implications of modern growth theory for the theory of Piketty). Next, the course will present the basic tools of Real Business Cycle and New Keynesian models. We also consider modern theories of financial crises and pay a lot of attention to the recent financial and euro crisis. Then, we will consider equilibrium search models which form the core of macro labor. Finally, we discuss budget deficits and Ricardian equivalence plus new political economy models where the behavior of policy makers are part of the model.

Form of tuition

lecture

Type of assessment

written interim examination
plus problem sets.

Course reading

Romer, David Advanced Macro Economics. 3rd edition, McGraw Hill.

Asset Pricing

Course code	E_FIN_AP ()
Period	Period 1
Credits	6.0
Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	dr. R.C.J. Zwinkels
Examinator	dr. R.C.J. Zwinkels
Teaching staff	dr. R.C.J. Zwinkels
Teaching method(s)	Lecture, Study Group
Level	400

Course objective

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 equity markets.
- Understand the drivers 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 problems.
- Be comfortable with doing advanced analyses in Software such as Microsoft Excel.

Course content

Starting from basic (undergraduate) Investments knowledge, this course centers around the issues of asset pricing and asset allocation. In the first week we revisit the well-known mean-variance framework and derive the standard CAPM in this set-up. 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. In addition, the course builds on both theory and empirics.

Form of tuition

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 (see below), and in-depth discussion of particular technical issues. In addition, there are three assignments: one individual assignment (Excel test) and two group assignments. The focus of these 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.

Type of assessment

To pass this course, you need a minimum final grade of 6.0 and a minimum grade on the written exam of 5.0. If you score less than 5.0 on the written exam, your final grade is equal to that grade. If you score 5.0 or higher, the final grade is given by:

Final grade = $0.75 \times (\text{Written exam grade}) + 0.2 \times (\text{Average group assignment grades}) + 0.05 \times (\text{Individual assignment grade})$.

Course reading

- Selected research articles and news clippings.
- Lecture notes.
- [For background reading] Bodie, Kane, Markus: Investments (2008; MacGraw-Hill)

Entry requirements

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)).

Recommended background knowledge

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.

Remarks

This course may have an in-depth empirical follow-up by choosing an appropriate Investments team-research-project during the January / February period.

Asymptotic Statistics

Course code	X_400323 (400323)
Period	Period 1+2
Credits	8.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Level	500

Course content

This course is part of the joint national master programme in mathematics. For schedules, course locations and course descriptions see <http://www.mastermath.nl>. Registration required via <http://www.mastermath.nl>.

Target group

mMath

Registration procedure

You have to register your participation in each Mastermath course via <http://www.mastermath.nl/registration/>

Registration is mandatory and absolutely necessary for transferring your grades from Mastermath to the administration of your university.

Bank Management

Course code	E_BA_BANKM (61442330)
Period	Period 4
Credits	6.0
Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	drs. T.A.J. de Jong
Examinator	drs. T.A.J. de Jong
Teaching method(s)	Lecture
Level	400

Course objective

This course aims to give students insight in various aspects in running a banking business. It applies various general academic frameworks - ranging from financial economics to organisation management - in the practical banking business.

Course content

This course deals with two important aspects of bank management: the bank business model and business process management within a bank. The first topic is about financial economics, however 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 aforementioned RAROC. 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 and has to be aligned with the Basel Framework, including Basel III. The current credit 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.

Finally there will be attention for 'banking' alternatives. What is the future business model of banks, is it still viable in the coming decade? What will be the impact of alternatives like crowd-funding, private equity etc.

Form of tuition

Lectures, and and a (group) assignment

Course reading

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

Behavioral Corporate Finance

Course code	E_FIN_BCF ()
Period	Period 4
Credits	6.0
Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	dr. M.J. van den Assem
Examinator	dr. M.J. van den Assem
Teaching staff	dr. M.J. van den Assem
Teaching method(s)	Lecture
Level	400

Course objective

The objective of this course is to introduce students to key behavioral phenomena that influence decision making of investors, managers and corporations.

Upon completion of this course, students will

- have gained substantial knowledge of behavioral factors relevant to economic activities;
- understand the possible influence on company operations, financing and investment.

Students will also be able to

- apply their knowledge of human economic behavior to real-world scenarios;
- avoid some clearly suboptimal decisions due to behavioral biases.

Course content

Traditional finance assumes that market participants are rational, that is, they have the ability to process information correctly and make choices that are in their own interests. However, real-world experience and empirical studies suggest that these assumptions do not always hold. Behavioral finance draws upon insights from psychology to describe human behavior. Individuals base their decisions on heuristics and are affected by biased beliefs as well as framing effects such as overconfidence, loss aversion, anchoring or mental accounting. We explore how individuals' beliefs and preferences affect their own financial decisions, corporations, and the financial markets overall. We will discuss behavioral anomalies and how they can be persistent due to limits of arbitrage. When we focus on corporations, we will examine two, not necessarily mutually exclusive, channels. First, managers themselves are subject to behavior that is not fully rational. Second, managers may cater to or game investors whose behavior is less than fully rational.

Form of tuition

Lectures

Type of assessment

Exam (80%)

Assignment (20%)

Course reading

Lecture slides
Journal publications

Recommended background knowledge

Sound knowledge of corporate finance and investments.

Remarks

For students MSc Finance.

Not accessible for students MSc Business Administration, Financial Management track. Financial Management students from the MSc Business Administration can instead take the course Financial Decision Making, which deals with similar topics.

Corporate Governance, Risk Management and Control

Course code	E_ACC_CGRMC (60452000)
Period	Period 5
Credits	6.0
Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	dr. G. Budding
Examinator	dr. G. Budding
Teaching method(s)	Lecture, Study Group
Level	400

Course objective

This course aims to provide students with an understanding of how financial reporting processes are embedded in a wider context of corporate governance, internal control and risk management. Students learn to consider issues relating to financial reporting integrity at the intersection of regulations and codes (Institutional awareness), tools and concepts of information systems, risk management and control (Technical knowledge), and ethical issues (Reflection). Using a case-based approach, the course develops students' Problem-solving skills and Communication skills.

After following this course, students:

- Can explain the importance, meaning and inter-relations between Corporate Governance, Internal Control and Risk Management;
- Can discuss the roles and responsibilities of the various stakeholders in a private or public organization;
- Know the content of the vital Corporate Governance codes and understand the substantial similarities and differences between various codes;
- Understand how risk management can be embedded into the internal control structure of the organization;
- Understand the importance of proper information systems in the implementation of an internal control system
- Understand the limitations of Corporate Governance codes with respect to ensuring "proper" management
- Can apply and combine the knowledge and understanding as outlined above to analyze and discuss issues related to financial reporting

integrity in the context of complex case settings.

Course content

Corporate governance is the process and structure used to direct and manage the business and affairs of the corporations with the objective of enhancing shareholder value, which includes ensuring the financial viability of the business.

Corporate governance covers a wide range of issues that are of interest to different disciplines including economics and law. In this course, we approach corporate governance from an accounting angle, because the integrity of financial reporting processes is a key aspect of corporate governance. In practice, corporate governance problems frequently come to light in the form of accounting scandals. In this course, we consider the causes and circumstances of such scandals, and we apply concepts from

enterprise risk management and internal control to the financial reporting process to identify and understand potential governance issues and their resolution. We also consider issues relating to (un)ethical behavior in a corporate environment.

Form of tuition

Plenary lectures and discussion classes based on cases, prepared by students in advance. Participation in the discussion classes is mandatory.

In addition, students will work in small groups on one large case, on which a written paper needs to be submitted before the end of the course, and which has to be presented by students.

Type of assessment

Written closed-book exam

Paper and presentation

Course reading

To be announced.

Corporate Law

Course code	E_ACC_CL (60422000)
Period	Period 4
Credits	6.0
Language of tuition	Dutch
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	mr. J.E. Brink-van der Meer
Examinator	mr. J.E. Brink-van der Meer
Teaching staff	mr. J.E. Brink-van der Meer
Teaching method(s)	Lecture, Study Group
Level	400

Course objective

This course deals with the key issues of Dutch company law, mainly concentrating on corporations (BV's and NV's). The objective of this course is to deepen the participants' knowledge and insight of how Dutch corporations work and problems related to Dutch corporations (Institutional awareness). In working with corporate law, you will learn to improve your Compliance skills and Communication skills and will

develop your capacity for Reflection.

After following this course, you:

- have knowledge and insight of how Dutch corporations are organized
- have insight of problems related to Dutch corporations
- have knowledge of the 12 subjects listed below
- have worked with and discussed (real life) cases concerning Dutch corporations
- are informed on current affairs of the NV and BV, including recent case law of the Dutch Supreme Court

You should then be able to:

- give a reasoned opinion on questions concerning Dutch corporate law
- make an informed judgment about how corporate law applies in complex situations
- reflect on legal responsibilities of organizations and its management
- follow recent developments in the media concerning current affairs of the NV and BV, including recent case law of the Dutch Supreme Court

Course content

The course is organized around 12 subjects:

- Introduction and basics of Dutch company law
- European company law
- Concern law
- Internal governance of companies
- Corporate governance
- Capital protection
- Liability of (supervisory) directors and shareholders
- Listed and non-listed companies
- Protective devices
- Mergers and acquisitions
- Law regarding annual accounts
- Disputes

The subjects form a basic toolbox of corporate law. They are relevant to your career in accounting and control. We will discuss the subjects in a practical way.

Form of tuition

Lectures, study group

Type of assessment

Written examination and one assignment. The written exam accounts for 80 percent of the final mark and the assignment accounts for 20 percent of the final mark. The grade for the written examination must be at least a 5.0.

Course reading

- Huizink, J.B., Rechtspersoon, vennootschap en onderneming, Deventer: Kluwer, most recent edition
- Wettenbundel Rechtspersonen, inclusief ondernemings- en handelsrecht met toekomstige wetgeving. Kluwer, most recent edition
- Documents placed on Blackboard, including but not limited to syllabus J.E. Brink- van der Meer

Remarks

This course description relates to the Dutch-language version of the course Corporate Law (E_ACC_CL). Please note that there is also an English-language version (E_ACC_CLIS).

The Dutch-taught version of Corporate law is mandatory for all Dutch-speaking full-time students and all part-time students from the MSc Programme Accounting and Control. The Dutch-taught course is recommended to students from other Master programs who aspire to a career in which elements of law play an important role (for instance corporate finance and banking).

International students should follow the course Corporate Law (International students), for which there is a separate course description.

Please make sure you register for the right course!

Corporate Law DSFMR

Course code	E_BA_CL ()
Period	Period 4
Credits	6.0
Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	mr. dr. B.H.A. van Leeuwen
Examinator	mr. dr. B.H.A. van Leeuwen
Teaching staff	mr. dr. B.H.A. van Leeuwen
Teaching method(s)	Lecture, Study Group
Level	400

Corporate Valuation

Course code	E_BA_CV ()
Period	Period 2
Credits	6.0
Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	dr. M. Millone MSc
Examinator	dr. M. Millone MSc
Teaching staff	dr. M. Millone MSc
Teaching method(s)	Lecture
Level	400

Course objective

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

Course content

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 high growth perspectives, valuation of corporate social responsibility and finally we will discuss the valuation of companies such as Facebook and Instagram.

Corporate valuation also is impacted in different ways by Corporate Governance: ownership structure, control issues and legal environment.

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

Form of tuition

Lectures (2 times 2 hours per week)

Type of assessment

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

Course reading

- Custom book "Advanced Corporate Finance" ISBN 978 1 780163000
- Valuation, McKinsey (5th edition). This is an e-book.

Entry requirements

Advanced Corporate Financial Management 4. 1

Corporate Valuation for Finance

Course code	E_FIN_CVF ()
Period	Period 2
Credits	6.0
Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	dr. M. Millone MSc
Examinator	dr. M. Millone MSc
Teaching staff	dr. M. Millone MSc
Teaching method(s)	Lecture
Level	400

Course objective

This course elaborates on the course Advanced Corporate Finance 4.1. Aim is to complete the overview of Corporate Finance field Corporate

Valuation is closely interconnected with Corporate Financing decisions.

Course content

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 high growth perspectives, valuation of corporate social responsibility and finally we will discuss the valuation of companies such as Facebook and Instagram.

Corporate valuation also is impacted in different ways by Corporate Governance: ownership structure, control issues and legal environment.

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

Form of tuition

Lectures (2 times 2 hours per week)

Type of assessment

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

Course reading

- Custom book "Advanced Corporate Finance" ISBN 978 1 780163000
- Valuation, McKinsey (5th edition). This is an e-book.

Entry requirements

Advanced Corporate Finance 4.1

Data Mining Techniques

Course code	X_400108 (400108)
Period	Period 5
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	dr. M. Hoogendoorn
Examinator	dr. M. Hoogendoorn
Teaching staff	dr. M. Hoogendoorn
Teaching method(s)	Lecture
Level	500

Course objective

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.

Course content

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).

Form of tuition

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

Type of assessment

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.

Course reading

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

Recommended background knowledge

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

Target group

mBA, mCS, mAI, mBio

Derivatives

Course code	E_FIN_DER (60442060)
Period	Period 2

Credits	6.0
Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	dr. N.J. Seeger
Examinator	dr. N.J. Seeger
Teaching staff	dr. N.J. Seeger
Teaching method(s)	Lecture, Study Group
Level	400

Course objective

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.

Course content

In today's 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

Form of tuition

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.

Type of assessment

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

Course reading

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

Further References:

- Das, R.K. and S.R. Sundaram: Derivatives: 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.

Entry requirements

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 Siegmans.

Econometrics for Quantitative Risk Management

Course code	E_FIN_EQRM ()
Period	Period 1+2
Credits	6.0
Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	dr. C.S. Bos
Examinator	dr. C.S. Bos
Teaching staff	prof. dr. A. Lucas, dr. C.S. Bos
Teaching method(s)	Lecture, Study Group
Level	400

Course objective

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.

Course content

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 general statistical framework for extremum estimators. After this, different estimation and inference procedures are dealt with as special cases of this more general paradigm and illustrated in their particular application to financial econometrics research questions. These include linear and non-linear regression, maximum likelihood estimation, and GMM. We consider time series, cross sectional, and panel data settings.

Students are required to implement some of the methods in case assignments using computer coding. We use Ox as our standard programming language, but students are free to choose some other language if they prefer.

Form of tuition

Hayashi, F. (2000): Econometrics. Princeton University Press.

Slides and lecture notes.

Relevant academic papers.

Type of assessment

There is a final written exam (80 percent).

There is case work during the course (20 percent).

Course reading

Tsay, R. S. (2010): Analysis of Financial Time Series, 3rd edition. John Wiley & Sons.

Entry requirements

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, Ox is used (www.oxmetrics.com). A bootcamp 'Principles in Programming in Econometrics' is organized for Ox in the last week of August, 2015. Please register.

Indication of entry level:

Edwards, C.H., and D.E. Penney (2002), Calculus with analytic Geometry (with early transcendentals, matrix version). Prentice Hall
 Casella, G., and R.L. Berger (2001): Statistical Inference.

Dusbuy

Stock & Watson (2010), Introduction to Econometrics

Bodie, Kane, Marcus (1996), Investments.

Empirical Finance

Course code	E_FIN_EF (60442070)
Period	Period 2
Credits	6.0
Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	prof. dr. A. Lucas
Examinator	prof. dr. A. Lucas
Teaching staff	prof. dr. A. Lucas, dr. A. Opschoor
Teaching method(s)	Lecture, College case
Level	400

Course objective

Upon successful completion, students should

- have a thorough understanding of empirical research methodology in finance (including (non-linear) regression, endogeneity, instrumental variables, time series, volatility models, logit/probit, simulation, forecasting);
- be able to select the appropriate methodology for an empirical research question;
- be able to set up an empirical analysis and gather and clean the data for this analysis;
- be able to use a statistical package to obtain empirical results;
- be able to critically interpret and assess the results obtained;
- be able to report the results clearly and concisely;
- be able to understand and critically evaluate empirical finance 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.

Course content

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.

The course concentrates on the following issues: 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.

Form of tuition

The first week there is an introductory computer lab session to get familiar with the software used in class, STATA. There are three lecture sessions each week for six weeks. One of these sessions may be a Q&A session or case discussion, if needed.

Teaching 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 computer exercises is to give students the practical skills for solving empirical finance problems.

Type of assessment

There is a final written exam (80 percent).

There case work during the course (20 percent).

Course reading

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).

Entry requirements

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.

Recommended background knowledge

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

Further, the entry level texts of the MSc Finance programme:

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.

Empirical Research in Accounting

Course code	E_ACC_ERA (60412000)
Period	Period 1
Credits	6.0
Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.

Coordinator	dr. M. Schoute
Examinator	dr. M. Schoute
Teaching staff	dr. M. Schoute, dr. E. Wiersma
Teaching method(s)	Lecture, Study Group
Level	400

Course objective

The purpose of this course is to explore and provide an understanding of the different research methods employed in empirical accounting research. At the end of the course the student should have a strong enough understanding of the different methods discussed to be able to interpret and critically evaluate empirical accounting studies (critical skills), and to be able to use these methods to conduct an empirical accounting study him/herself (technical research skills).

After following this course, you:

- will have a better understanding of the main research methods used in empirical accounting research, and their strengths and weaknesses;
- will be better able to interpret and critically evaluate empirical accounting research;
- will be better able to yourself conduct empirical accounting research.

Course content

Empirical research in accounting relates to financial accounting, management accounting and auditing. In accounting research, a wide variety of empirical research methods are used. This variety stems from the diversity of theories used, topics and questions studied and the research methods researchers have at hand. Some general patterns can be observed, though. For instance, while financial accounting research often builds on publicly available data archives, management accounting research often builds on company-specific data. This difference partly stems from the difference in questions these domains of accounting are interested in, but also from the availability of data. The course starts with an overview of the types of questions studied in empirical research in financial accounting, management accounting, and auditing, and the types of methods and data used for analysis. After this overview the remainder of the course is structured following the research methods most frequently employed in accounting research. Each method will be studied in depth in relation to the type of question it is suitable for. In this analysis, the focus will lie on both the use of the method and the (accounting) domain it is being used in. Some of these methods are also widely used for more practical applications. Overall, the course aims to prepare students for writing their Master thesis, as well as for other Master courses that build strongly on empirical accounting papers.

Form of tuition

Lectures (4 hours a week).

Discussion classes (2 hours a week).

Type of assessment

Written exam (60% of the final grade).

Team assignment (40% of the final grade).

Course reading

Smith, M. 2015. Research Methods in Accounting (3rd Edition). London, UK: Sage.

A series of empirical accounting papers.

Entry requirements

The course assumes basic background knowledge of business research methods and statistics. Knowledge of research methods equivalent to Methoden en Technieken BE 3.2. is required.

Ethics

Course code	E_BA_ETH (61432100)
Period	Period 3
Credits	3.0
Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	prof. dr. J.F.D.B. Wempe
Examinator	prof. dr. J.F.D.B. Wempe
Teaching staff	prof. dr. ir. H.A. Rijken, dr. L.A. Havermans
Teaching method(s)	Lecture, Seminar
Level	400

Course objective

- To become competent in describing moral problems
- To be able to analyze moral problems of professionals embedded in organizations
- To know how to apply concepts of moral philosophy in describing and solving such problems of embedded professionals

Course content

Moral philosophy studies responsibilities or duties as conceived by acting individuals in order to justify their acts. Organization ethics is questioning the moral behaviour of organizations as such and of individuals acting within organizations. Professional ethics is questioning the behaviour of individuals acting in professional capacities. Does the organizational context make a difference here? It seems that classical ethics is a process of observing, questioning, grounding, and deriving rules from earlier established principles and values. The course briefly will explore questions such as these:

- 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 relevant are concepts about a just society, fairness or justice?
- 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?
- What are the instruments of enforcing morals (compliance) in professional societies and in organizations?

In this course on Ethics five competences will be considered:

- How to recognize and describe a moral problem

- To know the difference between principles, values, and norms
- To know the main traditional modes of arguing
- To distinguish between the responsibility of individual (and professional) participants or employees within an organization and the responsibility of the organization and its management as such
- To be able to connect the concept of a pluriform society with the need for professional and business ethics

Form of tuition

lecture
working group

Type of assessment

paper
Individual examination or a paper written individually with a proposal approved before the examination date.

Course reading

Text 'Understanding Compliance' will be for sale (approximately 10 euro) in the 1st lecture.

Evolutionary Computing

Course code	X_400111 (400111)
Period	Period 1
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	prof. dr. A.E. Eiben
Examinator	prof. dr. A.E. Eiben
Teaching staff	prof. dr. A.E. Eiben, J.V. Heinerman MSc
Teaching method(s)	Lecture
Level	400

Course objective

To learn about computational methods based on Darwinian principles of evolution. To illustrate the usage of such methods as problem solvers and as simulation, respectively modelling tools. To gain hands-on experience in performing experiments.

Course content

The course is treating various algorithms based on the Darwinian evolution theory. Driven by natural selection (survival of the fittest), an evolution process is being emulated and solutions for a given problem are being "bred". During this course all "dialects" within evolutionary computing are treated (genetic algorithms, evolutiestrategieën, evolutionary programming, genetic programming, and classifier systems). Applications in optimisation, constraint handling, machine learning, and robotics are discussed. Specific subjects handled include:
various genetic structures (representations), selection techniques, sexual and asexual variation operators, (self-)adaptivity. Special attention is paid to methodological aspects, such as algorithm design and tuning. If time permits, subjects in Artificial Life will be handled. Hands-on-

experience is gained by a compulsory programming assignment.

Form of tuition

Oral lectures and compulsory programming assignment. Highly motivated students can replace the programming assignment by a special research track under the personal supervision of the lecturer(s).

Type of assessment

Written exam and programming assignment (weighted average).

Course reading

Eiben, A.E., Smith, J.E., Introduction to Evolutionary Computing.

Springer, 2003 ISBN 3-540-40184-9.

Slides available from <http://www.cs.vu.nl/~gusz/ecbook/ecbook.html> .

Target group

mBA, mAI, mCS, mPDCS

Financial Sector Regulation

Course code	E_BA_FSR ()
Period	Period 4
Credits	6.0
Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	prof. dr. S.G. van der Lecq
Examinator	prof. dr. S.G. van der Lecq
Teaching staff	prof. dr. S.G. van der Lecq
Teaching method(s)	Lecture
Level	400

Financial Markets and Institutions

Course code	E_FIN_FMI (60442080)
Period	Period 4
Credits	6.0
Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	dr. I.P.P. van Lelyveld
Examinator	dr. I.P.P. van Lelyveld
Teaching staff	dr. I.P.P. van Lelyveld
Teaching method(s)	Lecture
Level	400

Course objective

The purpose of this course is to develop an understanding of the economics underlying financial intermediation, financial markets and banking, with a particular focus on the recent financial turmoil and its consequences.

Course content

We start by discussing the traditional role of commercial banks in the financial system and how banks manage risks. Topics include the major risks faced by banks, lending and asymmetric information, credit rationing, and securitisation. This leads us into a discussion of financial fragility covering, inter alia, liquidity provision, bank runs, deposit insurance and opacity. Then we discuss how various regulations could be helpful or not. A natural follow up is laying out the causes, triggers and dynamics of the Great Crisis (2007-2009). Given the depth of the crisis, 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.

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 on how central banks have handled the sovereign crisis and how asset managers function.

Form of tuition

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 (9 February, 9.00-10.00 am, 5A-24).

In the second week there will be an additional non-compulsory lecture to discuss question Mishkin et al for those without a banking background (e.g. econometrics students). (9 February, 10.00-11.00 am, 5A-32)

Question should be raised on the Blackboard forum.

Type of assessment

Final grade is based on a two-hour, 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). In the case of a resit in later periods (i.e., in 2017 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 Blackboard 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).

Currently the topic is set to be the split between investment banking (the casino) from retail banking (the utility). Such a split has been argued to increase financial stability and reduce moral hazard. However, if a more interesting policy question arises closer to the course, the topic might change.

The assignment should be written in groups of at most three. Please use the appropriate sign up tool on Blackboard. 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 is Lecture 10.

Course reading

We will make use of the following non-mandatory textbook:

- Mishkin, F., K. Matthews, and M. Giuliadori, The Economics of Money, Banking and Finance, European edition. From this book we will cover all of Chapters 8 through 12.

In addition several mandatory academic papers will be posted to Blackboard.

Lecture notes will be available on Blackboard 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 Blackboard.

Entry requirements

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

Globalization, Growth and Development

Course code	E_EC_GGD (60442050)
Period	Period 4
Credits	6.0
Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	prof. dr. C.T.M. Elbers
Examinator	prof. dr. C.T.M. Elbers
Teaching staff	prof. dr. C.T.M. Elbers
Teaching method(s)	Lecture
Level	400

Course objective

Aim of the course is to study aspects of globalization, growth and development that are fruitfully studied from the perspective of the economics discipline. After following the course the student will

- know the basic facts concerning the topics discussed in the course
- have a thorough understanding of these topics, in particular their economic dimension
- have learnt various empirical research techniques that can be applied within this field of economics
- be able to present and discuss current journal articles and book chapters on globalization

Course content

Globalization poses both challenges and offers opportunities to rich and poor countries. The course focuses on a number of themes that have been

central in the academic and public discussion of recent trends in the world economy. Among them are:

- Relationship between growth, trade and poverty
- Globalization and inequality
- Trade shocks, resources and civil conflict
- Environmental and labour standards
- Volatility of terms-of-trade
- Institutions
- Migration
- Financial stability

More topics in globalization are introduced in the course in the form of student presentations. The course stresses the importance of empirical research and devotes significant time to the empirical strategies that have been used by researchers in studying globalization.

Form of tuition

Lectures, Student Presentations and Discussions

Course reading

Selected articles

Entry requirements

Advanced Macroeconomics 4.2 and International Economics 3.2

Institutional Investments and ALM for Finance

Course code	E_FIN_IIALMF ()
Period	Period 4
Credits	6.0
Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	dr. M. Boes
Examinator	dr. M. Boes
Teaching staff	dr. M. Boes
Teaching method(s)	Lecture
Level	400

Course objective

This course has a dual objective.

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

Second, 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 instruments like swaps and swaptions.

The course not only develops the theoretical background, but also discusses the way these concepts are used in practice.

After following the 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 derivatives such as (inflation) swaps and swaptions and their strategic use by institutional investors.
- Have an overview of the practical implementation of ALM studies in the financial industry.
- Have an up-to-date knowledge of the recent developments in regulations.
- Have a sound understanding on how linear and non-linear derivatives can be used by pension funds in their balance sheet management.
- Have knowledge on how pension funds decide on issues like currency hedging and benchmark choice for investment portfolios.

Course content

The first week gives a broad introduction to pension funds. Specifically, the course starts with 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.

In weeks 2 and 3 we will focus on fixed income derivatives. The approach taken won't be purely theoretical as the practical usage of these derivatives will be shown by means of a real-life investment portfolio of a large Dutch pension fund.

In weeks 4 and 5 the ideas and theories treated so far are translated into practical balance sheet management of pension funds. We won't focus solely on fixed income but will also look at the practical consequences of strategic choices on equity investing and currency hedging.

We intend to finish the course in the sixth week by a guest lecture and by some exam preparation.

Form of tuition

Lectures (2 times 2 hours per week) plus two cases.

Type of assessment

Written exam and two cases.

Course reading

- Hull: Options, futures, and other derivatives (8th edition)
- Additional course material (academic papers, etc.) will be provided on Blackboard

Remarks

The course brings students up to date with the recent developments in the field of fixed income derivatives and institutional investing. To do so efficiently, the course builds on earlier courses.

In particular for the fixed income derivatives part, the course presumes students are familiar with the material from the course Derivatives (period 2), including the programming assignments of that course.

Students should also master basic Asset Pricing (period 1) theory, and simple time series models such as the vector autoregression (VAR, e.g., Empirical Finance in period 2).

Internship

Course code	E_FIN_INTFD ()
Period	Ac. Year (September)
Credits	6.0
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	dr. S.A. Borovkova
Examinator	dr. S.A. Borovkova
Level	400

Quantitative Financial Risk Management

Course code	E_FIN_QFRM (60422110)
Period	Period 5
Credits	6.0
Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	dr. S.A. Borovkova
Examinator	dr. S.A. Borovkova
Teaching staff	dr. S.A. Borovkova, dr. A. van Haastrecht
Teaching method(s)	Lecture
Level	400

Course objective

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

Course content

The lecturers are Dr. S. Borovkova, an expert on derivatives, risk management and energy markets, and Dr. A. van Haastrecht, Senior Risk Manager of ING Insurance. In this course we will examine various types of financial risks facing corporations and financial institutions, such as market, credit and operational risks. 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.

Form of tuition

Lectures (6 hours per week)

Type of assessment

2 practical assignments and written exam

Course reading

Embrechts, Frey and McNeal "Quantitative Risk Management"
Counterparty Credit Risk by Brigo, Morini and Palaviccini

Recommended background knowledge

Introductory statistics and probability, implementation skills (Excel, Matlab, Eviews or any other computer package)

RABO Honours Class

Course code	E_FIN_RHC ()
Period	Period 4+5
Credits	9.0
Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	dr. T.C. Dyakov
Examinator	dr. T.C. Dyakov
Teaching method(s)	Lecture
Level	400

Real Estate Management

Course code	E_BA_REM (61452040)
Period	Period 5
Credits	6.0
Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	prof. dr. J. Rouwendal
Examinator	prof. dr. J. Rouwendal
Teaching staff	prof. dr. J. Rouwendal, dr. F. Hamelink
Teaching method(s)	Lecture
Level	400

Course objective

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 invest 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.

Course content

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 CDO's and CMO's) that have played an 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 investment vehicles in real estate available to an institutional investor.

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

Type of assessment

Written examination.

Course reading

- 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 will be provided on Blackboard.

Remarks

This course is organised by the VU. For more information, please go to <http://www.feweb.vu.nl/en/students/study-guide/msc-entrepreneurship/programme/index.asp>

Research Project for Finance

Course code	E_FIN_RPFIN (60432010)
Period	Period 3
Credits	6.0
Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	dr. G. Tumer Alkan

Examinator	dr. G. Tumer Alkan
Teaching staff	prof. dr. A. Lucas, dr. S.A. Borovkova, prof. dr. A.C.F. Vorst, dr. G. Tumer Alkan, dr. M. Millone MSc, dr. T. Artiga Gonzalez
Teaching method(s)	Study Group
Level	400

Course objective

This course will allow students to apply their knowledge acquired so far to applied research projects in various fields of finance. Working in teams of 3-4, students will investigate a well delimited area by reviewing relevant existing academic as well as practitioners oriented literature. They will empirically apply the theory to real life data. Students will be encouraged to gather information from various sources, including from practitioners in the industry via for example surveys. Students will have to draw upon the material taught both during their undergraduate degree and during their Master in Finance program. Upon completion, students should be able to:

- identify the relevant academic literature for their area of research
- formulate precise research questions and hypotheses in a specific field based on the academic literature - gather data to test their hypotheses
- choose appropriate (statistical) methodology for the research, implement this on the data, and interpret the findings
- communicate their research set-up and findings clearly, both orally and in writing
- carefully plan a demanding project on a tight time-line
- cooperate in a team to increase team output on a research project

Course content

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 blackboard 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, both in the area of financial markets and corporate 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 40 to 80 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.

Form of tuition

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

Type of assessment

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).

Course reading

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

Entry requirements

Students should have a good overall knowledge of the various topics taught in the courses so far. For Finance students, this includes 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.

Simulation and Stochastic Systems

Course code	E_EORM_SSS (64412010)
Period	Period 4
Credits	6.0
Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	dr. A.A.N. Ridder
Examinator	dr. A.A.N. Ridder
Teaching staff	dr. A.A.N. Ridder
Teaching method(s)	Lecture
Level	400

Course objective

The objective of this course is to learn how to develop and execute a simulation study of a stochastic system. This incorporates all aspects of an operations research study: data collecting, modeling, analyzing, programming, writing a report and presenting the results.

Course content

The course gives a broad treatment of the important aspects of stochastic simulation and its applications to queuing, reliability, manufacturing, risk analysis, and financial models. The topics covered include random number generators, generating random variates, simulation

of Lindley processes, statistical output analysis, steady-state simulation, variance reduction techniques, importance sampling and other rare-event simulation techniques, Markov chain Monte Carlo, and stochastic optimization. The emphasis is on the mathematical analysis of properties of these simulation methods. There will be assignments in which the students apply simulation issues to problems either by theoretical analysis, or by programming. The simulation programs are written in C, C++, Java, Matlab, or Python. Towards the end of the course the student studies a scientific paper on a simulation topic and gives a presentation of it.

Form of tuition

lecture and tutorial

Type of assessment

1. homework problems
2. Paper presentation
3. Written exam

Course reading

R.Y. Rubinstein and D.P. Kroese. Simulation and the Monte Carlo Method, second edition, Wiley 2008.

Entry requirements

Probability and Statistics, Stochastic models, Programming experience.

Recommended background knowledge

Probability and Statistics; Stochastic models; Programming skills

Stochastic Optimization

Course code	X_400336 (400336)
Period	Period 1+2
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	dr. S. Bhulai
Examinator	dr. S. Bhulai
Teaching staff	dr. S. Bhulai
Teaching method(s)	Lecture
Level	400

Course objective

The goal of the course is to discuss techniques from the field of stochastic optimization and their applications.

Course content

This course deals with the theory and algorithms for stochastic optimization with an application to controlled stochastic systems (e.g., call center management, inventory control, optimal design of communication networks). We discuss aspects of semi-Markov decision theory and their applications in certain queueing systems. In a programming assignment, students learn to implement optimization algorithms and experiment with them. Experience with and insight into the more theoretical subject is obtained through homework exercises.

Form of tuition

Lectures.

Type of assessment

Programming and written exercises, final exam.

Course reading

Lecture notes will be posted on BlackBoard

Entry requirements

Stochastische Methoden (400391) or equivalent and a programming language.

Recommended background knowledge

Stochastische Processen (X_401026) and Wachtrijmodellen (X_401061) or equivalent courses on Stochastic Processes and Queueing Theory and a programming language.

Target group

mBA, mBa-D, mMath, mSFM

Stochastic Processes for Finance

Course code	X_400352 (400352)
Period	Period 1+2
Credits	6.0
Language of tuition	English
Faculty	Faculteit der Exacte Wetenschappen
Coordinator	dr. E.N. Belitser
Examinator	dr. E.N. Belitser
Teaching staff	dr. E.N. Belitser
Teaching method(s)	Lecture
Level	400

Course objective

Learn basics of stochastic processes in continuous time, including the concepts of martingales and stochastic integration; apply these concepts to price options on stocks and interest rates by the no-arbitrage principle.

Course content

Financial institutions trade in risk, and it is therefore essential to measure and control such risks. Financial instruments such as options, swaps, forwards, etc. play an important role in risk management, and to handle them one needs to be able to price them. This course gives an introduction to the mathematical tools and theory behind risk management.

A "stochastic process" is a collection of random variables, indexed by a set T . In financial applications the elements of T model time, and T is the set of natural numbers (discrete time), or an interval in the positive real line (continuous time). "Martingales" are processes whose increments over an interval in the future have zero expectation given knowledge of the past history of the process. They play an important role in financial calculus, because the price of an option (on a stock

or an interest rate) can be expressed as an expectation under a so-called martingale measure. In this course we develop this theory in discrete and continuous time. Most models for financial processes in continuous time are based on a special Gaussian process, called Brownian motion. We discuss some properties of this 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. Foremost, we develop the theory of no-arbitrage pricing of derivatives, which are basic tools for risk management.

Form of tuition

Lectures and exercises.

Type of assessment

Assignments and written examination.

Course reading

Lecture notes.

In addition, it is useful to have the following books:

Shreve, "Stochastic Calculus for Finance I: The Binomial Asset Pricing Model", Springer;

Shreve, "Stochastic Calculus for Finance II: Continuous-time models", Springer.

Entry requirements

Probability (X_400622) and Analysis 1 (X_400005), or their equivalents.

Recommended background knowledge

Measure Theory.

Target group

mBA, mBA-D, mMath, mSFM, master Econometrics.

Remarks

A significant part of the course is used to introduce mathematical subjects and techniques like Brownian motion, stochastic integration and Ito calculus. In view of this, the course is NOT meant for students who already followed the master course "Stochastic Integration". On the other hand, after completing this course, students may be motivated to follow the other one (Stochastic Integration) to study the above mentioned mathematical subjects in a deeper and more rigorous way.

Strategic and Cooperative Decision Making

Course code	E_EORM_SCDM (64422010)
Period	Period 2
Credits	6.0
Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	dr. J.R. van den Brink
Examinator	dr. J.R. van den Brink
Teaching staff	prof. dr. ir. G. van der Laan, dr. J.R. van den Brink, dr. I.D. Lindner
Teaching method(s)	Lecture

Level	400
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Course objective

The aim of this course is to learn and apply methods and techniques from cooperative and noncooperative game theory to economic and managerial problems. Special attention will be given to the analysis and economic application of networks. Students should be able to understand and to apply results that recently appeared in the international journals.

Course content

In this course we study strategic and cooperative decision making in situations where more than one party or agent is involved. In these situations the outcome is the result of the individual decisions made by the agents. In strategic decision theory we focus on the decisions made by the agents, where each agent takes account of the fact that its decision influences the outcome, and therefore the decision problem of the other agents. Agents behave strategically if each agent tries to behave in a way that is best for itself. In cooperative decision theory we focus on the outcome (and not on the individual decisions), taking into account the interests of all agents. We study different criteria that an outcome can satisfy, such as efficiency or equity, and look how to find a compromise between these criteria when they are conflicting. The methods we use to analyze and solve these problems borrow from (non-cooperative and cooperative) game theory, general equilibrium theory and social choice theory. Topics that will be discussed come from the field of economics and operations research and include: bargaining problems, auctions, cost sharing and allocation problems, operations research games, market games, assignment problems, profit distribution, voting problems, score rules, and location problems. Recently, various network models gained attention in the economic literature and applications. Therefore, in this course we give special attention to the analysis and economic application of networks.

Form of tuition

lecture
working group

Type of assessment

written examination
home assignment

Course reading

- Moulin, H., Fair Division and Collective Welfare. MIT Press, 2003.
- Lecture sheets, material from MOOC and a selection of recent articles from the literature

Entry requirements

- Mathematical Economics 1
- Recommended: Mathematical Economics 2

Thesis

Course code	E_FIN_THS ()
Period	Ac. Year (September)
Credits	18.0

Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	prof. dr. A.C.F. Vorst
Examinator	prof. dr. A.C.F. Vorst
Teaching method(s)	Lecture
Level	500

Thesis

Course code	E_FIN_THSQFD ()
Period	Ac. Year (September)
Credits	21.0
Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	prof. dr. A.C.F. Vorst
Examinator	prof. dr. A.C.F. Vorst
Level	500

Thesis

Course code	E_FIN_QFTHSS ()
Period	Ac. Year (September)
Credits	24.0
Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	prof. dr. M. van der Nat
Examinator	prof. dr. M. van der Nat
Teaching method(s)	Lecture
Level	500

Time Series Econometrics

Course code	E_EORM_TSE (64432000)
Period	Period 4
Credits	6.0
Language of tuition	English
Faculty	Fac. der Economische Wet. en Bedrijfsk.
Coordinator	prof. dr. S.J. Koopman
Examinator	prof. dr. S.J. Koopman
Teaching method(s)	Lecture
Level	400

Course objective

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

Course content

This 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.

Form of tuition

lecture

tutorial

Type of assessment

written interim examination

50 percent

written assignments

50 percent

Course reading

Selection of literature:

- Brockwell, P.J. & R.A. Davis, Time Series: Theory and Methods.

Springer-Verlag, 1991, 2nd edition.

- Durbin, J. & S.J. Koopman, Time Series Analysis by State Space

Methods. Oxford University Press, 2001.

- Kim, C-J & C.R. Nelson, State-Space Models with Regime Switching. The MIT Press, 1999.