COURSES BROCHURE

Quantitative Finance and Insurance

ADDITIONAL IT TRAINING

ADDITIONAL IT TRAINING

Academic year:	2021/2022
Course ID:	SEM0046
Teachers:	Luca Regis (Lecturer) Jan Andrzej Palczewski (Lecturer)
Teacher contacts:	luca.regis@unito.it
Degree course:	Finance Insurance and Statistics
Year:	1st year
Type:	Elective
Credits/recognition:	3
Course SSD (disciplinary sector):	SECS-S/01 - statistica SECS-S/06 - metodi matematici dell'economia e delle scienze att. e finanz.
Delivery:	Formal authority
Language:	English
Attendance:	Obligatory
Type of examination:	Oral

COURSE OBJECTIVES

english
The course aims at presenting some numerical techniques used in financial applications. The students will be working with Python in the first part of the course and will be introduced to the MATLAB software in the second part of the course.

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COURSE AIMS

english
Ability to handle numerical techniques suitable for financial problems in Python and Matlab.

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COURSE DELIVERY

english
 The first 16 hours of the course will be taught by prof. Jan Palczewsky and the remaining 16 hours by prof. Luca Regis.

Please download the last version of MATLAB using Unito campus licence and be ready to work on the software during classes.

LEARNING ASSESSMENT METHODS

english

Weekly assignments will have to be delivered during the course. They will constitute a coursework, to be delivered to pass the exam.

The final exam consists of a group project.

Projects must be chosen among a list that we will provide by the end of the course.

Groups should be composed of max 3-4 people.

The discussion of the project will consist in a short presentation of

the project.

The group is also expected to deliver a short report in

pdf format, containing:

- a description of the financial and mathematical problem;

- a description of the solution of the problem;

- the explanation of the numerical algorithms adopted;

- Code scripts and user-defined functions;

- discussion of the results.

As a general rule, try to write the code in the most efficient possible way, trying

to avoid for loops when possible by vectorizing the calculations.

I will supervise the projects and assist the groups in making the code.

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SUPPORT ACTIVITIES

PROGRAM

english

   - Financial applications with Python:

* Option pricing using binomial trees
* Monte Carlo methods for option pricing in Black-Scholes model
* Variance reduction techniques
* Numerical solution of stochastic differential equations and pricing in non-Black-Scholes markets
* Computation of Greeks and portfolio immunisation

- Programming and Financial Applications with MATLAB:

  * MATLAB Basics

  * Data handling with MATLAB

  * Generation of paths of jump/diffusive and jump stochastic processes

  * Monte Carlo simulation of portfolio dynamics and computation of risk measures

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SUGGESTED TEXTBOOKS AND READINGS

english

We will provide lecture notes and slides as course material.

Further resources that can prove to be useful are the following:

MAIN ONLINE FREE RESOURCES:

https://it.mathworks.com/help/matlab/

ADDITIONAL BOOKS AND ARTICLES:

P. Brandimarte, 2006, Numerical methods in finance and economics: a MATLAB-based introduction, Wiley.
P. Glasserman, 2003, Monte Carlo Methods in Financial Engineering, Spinger.

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NOTE

english

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Course webpage: https://www.finance-insurance.unito.it/do/corsi.pl/Show?_id=qitd

ADDITIONAL BOOKS AND ARTICLES:

P. Brandimarte, 2006, Numerical methods in finance and economics: a MATLAB-based introduction, Wiley.
P. Glasserman, 2003, Monte Carlo Methods in Financial Engineering, Spinger.

ADVANCED ASSET PRICING

ADVANCED ASSET PRICING

Academic year:	2021/2022
Course ID:	SEM0089
Teachers:	Roberto Marfe' (Lecturer)
	Julien Penasse (Lecturer)
Teacher contacts:	n/d, roberto.marfe@unito.it
Degree course:	Finance
	Insurance and Statistics
	Generic
Year:	2nd year
Type:	Elective
Credits/recognition:	6
Course SSD (disciplinary sector):	SECS-S/06 - metodi matematici dell'economia e delle scienze att. e finanz.
Delivery:	Formal authority
Language:	English
Attendance:	Obligatory
Type of examination:	Oral

PREREQUISITES
Basic stochastic calculus, statistics, econometrics, and asset pricing.

COURSE OBJECTIVES

english

This course focuses on asset pricing and its relation with the macroeconomy.

The first part deals with asset pricing theory.

The second part reviews equilibrium asset pricing models.

The third part, if time permits, is devoted to some special topics.

italian

Questo corso si focalizza sulla valutazione dei titoli finanziari e la sua relazione con la macroeconomia.

La prima parte riguarda la teoria di valutazione dei titoli.

La seconda parte esamina alcuni modelli di equilibrio di valutazione dei titoli.

La terza parte, se il tempo lo permette, è dedicata ad alcuni argomenti specifici.

COURSE AIMS

english

Students should understand (i) how investors take financial decisions, (ii) how the aggregation of individuals investors gives rise to equilibrium market prices, and (iii) how asset prices relate with macroeconomic fundamentals.

italian

Gli studenti imparano (i) come gli investitori prendono decisioni finanziarie, (ii) come i prezzi dei titoli finanziari dipendano dal comportamento aggregato degli investitori e (iii) come i prezzi finanziari si relazionano con quantità macroeconomiche.

COURSE DELIVERY

english

The course is based on both formal lectures and at least as many hours of at-home reading and solving exercises.

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Il corso si basa sia su lezioni formali sia da almeno altrettante ore di lettura e risoluzione di esercizi a casa.

LEARNING ASSESSMENT METHODS

english

There is a final exam. The grade (up to 30L/30) is based on an exam taken on the official exam dates and eventually on students' presentations and/or assignments.

Because of the Covid-19 emergency, the examination procedure could change. See the Moodle for the details.

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Vi è un esame finale. Il voto è espresso in trentesimi e si basa su un esame svolto nelle date ufficiali d'esame ed eventualmente su presentazioni e compiti svolti durante il corso. A causa dell'emergenza Covid-19, le modalità di esame potrebbero cambiare. Leggere il Moodle per i dettagli.

PROGRAM

english

The course covers most of the contents of the book Financial Asset Pricing Theory by Claus Munk:

1. Stochastic processes for financial markets [Chs. 2-3]

2. State prices [Ch. 4]

3. Consumption and portfolio decisions of individuals [Chs. 5-6]

4. Equilibrium [Ch. 7]

5. Consumption-based asset pricing models [Chs. 8]

6. Advanced consumption-based asset pricing models [Chs. 9]

If time permits additional topic could be covered:

7. Factor models [Ch. 10]

8. Term structure of interest rates [Ch. 11]

9. Risk-adjusted probabilities [Ch. 12]

10. Derivative pricing [Ch. 13]

italian

Il corso copre la maggior parte dei temi del libro Financial Asset Pricing Theory di Claus Munk:

1. Processi stocastici per i mercati finanziari [Chs. 2-3]

2. Prezzi degli stati [Ch. 4]

3. Scelte individuali di consume e di portafogli [Chs. 5-6]

4. Equilibrio [Ch. 7]

5. Modelli standard di "consumption-based asset pricing" [Chs. 8]

6. Modelli avanzati di "consumption-based asset pricing" [Chs. 9]

Se il tempo lo permettesse, ulteriori tematiche potrebbero essere presentate:

7. Modelli fattoriali [Ch. 10]

8. Strutture a termine dei tassi di interesse [Ch. 11]

9. Probabilità aggiustate per il rischio [Ch. 12]

10. Valutazione dei derivati [Ch. 13]

SUGGESTED TEXTBOOKS AND READINGS

english

The main reference is:

Financial Asset Pricing Theory, Claus Munk, Oxford University Press.

The complete reading list will be available at the beginning of the course.

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Il testo di riferimento è

Financial Asset Pricing Theory, Claus Munk, Oxford University Press.

Ulteriore bibliografia sarà disponibile all'inizio del corso.

NOTE

REGISTER ONLINE on the Moodle by the first lecture of the course, please.

Course webpage: https://www.finance-insurance.unito.it/do/corsi.pl/Show?_id=0o7d

ASSET PRICING AND PORTFOLIO CHOICE

ASSET PRICING AND PORTFOLIO CHOICE

Academic year:	2021/2022
Course ID:	ECO0262
Teachers:	Giovanna Nicodano (Lecturer)
	Raffaele Corvino (Lecturer)
	Milo Bianchi (Lecturer)
Teacher contacts:	0116706073 o 5006, giovanna.nicodano@unito.it
Degree course:	Finance
	Insurance and Statistics
Year:	1st year
Type:	Distinctive
Credits/recognition:	9
Course SSD (disciplinary sector):	SECS-P/01 - economia politica
Delivery:	Blended
Language:	English
Attendance:	Obligatory
Type of examination:	Written

PREREQUISITES

Inglese

Fundamentals of calculus, statistics, econometrics, finance are prerequisites. If you are not familiar with financial markets and institutions, please cover ch. 1-5 of the following textbook in the Fall. Bodie Z., Kane A., Marcus A.J., Investments, 10th edition (or later) If you were never exposed to finance before, please check also Ch. 6-11, 13, 24. We will cover them but relatively quickly.

PROPEDEUTIC FOR

Advanced Asset Pricing (2 year, 6 CFU)

COURSE OBJECTIVES

inglese

Provide concepts and methods underlying modern financial analysis. The focus will be on asset pricing and quantitative investment management. There will also be an introduction to behavioral finance. Time allowing, we will cover some other topics.

COURSE AIMS

inglese

Students understand risks, their interactions, their management through portfolio choice, and their value.

COURSE DELIVERY

inglese

The course is based on lectures and at least as many hours of at-home reading and solving exercises. Q&A in the classroom is strongly encouraged, also after discussing in small groups the topic that has been covered. Students will be invited to attend finance research seminars (webinars) and conferences at Collegio Carlo Alberto. See schedule on Moodle

LEARNING ASSESSMENT METHODS

Inglese

The full exam tests both basic and advanced knowledge.

Basics: 10 multiple choice questions drawn from Bodie Kane and Marcus in 10 minutes. If more than half of the answers are wrong, the advanced part will not be corrected.

I will offer a test of the basics during the course. Those who pass it will not have to retake it in the Summer 2022.

Advanced Material: there will be two composite questions or exercises, each on a different topic, with limited space for precise answers to the questions. See the sample exam on Moodle.

Grades: the test of the basics is worth up to 10; composite questions on advanced material will be worth 10 points each.

In case exams revert online due to Covid, there will be an oral exam to validate the written grade in case is exceeds 26/30

Only in case of a covid emergency, the exam will be both ON MOODLE and WEBEX. You will receive a link the day before the exam, provided you signed up on ESSE3 as usual by the deadline. Please sign in Webex with your first and last name. Turn on your camera (facing you) and mic 15 minutes before the start of the Moodle test/exam and have your Smart Card ready. Log in Moodle 15 minutes before the exam.

DATA-BASED OPTION: it is possible to apply in order to substitute the Advanced Exam with a MATLAB-based exam (max grade 16/30). We will collect applications by students wishing to pursue this option on April 26.

A necessary condition for being able to take this option is to attend and participate to all the advanced lectures, including the ones on behavioural finance. You will be asked to perform a proper

quantitative analysis on stock market data, applying the programming skills and economics acquired during the course. Students will have to compose a Matlab script, running the commands they think may be useful to complete the tasks. The Matlab script must be correctly working. Then, the students will have to interpret their results through the lens of the economic and financial background covered during the lectures. The final output of this option consists of two files: (1) the Matlab script, and (2) a Word document, where students will report their results and comments.

Timing: the tasks, together with the data, will be provided by June 19th. The two output files must be submitted by July 10th. The tasks must be completed individually.

SUPPORT ACTIVITIES

Lecture notes on advanced topics and other materials are distributed through the Moodle forum.

Please register online before the beginning of the course, on Moodle, adding a passport-like picture of yourself. Ensure you select the academic year 2021-2022.

PROGRAM

inglese

First Part: Asset Pricing (Giovanna Nicodano)

- stylized facts, risk and return, Mean Variance analysis, capm and apt, performance evaluation, stochastic discount factor, consumption-capm

Second Part: Applications (Raffaele Corvino)

- portfolio selection, efficient frontier, utility and optimal portfolio, diversification, capm and estimation

Third Part: Some Topics in Advanced Portfolio Choice drawn from the list below (Giovanna Nicodano)

- another look at returns

- long term portfolio choice

- hedging and portfolio choice: households' portfolio choice

- accounting for illiquidity and illiquidity risk

- accounting for non Gaussian returns

- ESG, pricing and portfolio choice

- estimation risk and Black Litterman

- 12 -

Fourth Part: Behavioral Finance (Milo Bianchi)

- prospect theory, ambiguity aversion, time inconsistency, overconfidence, limited attention

SUGGESTED TEXTBOOKS AND READINGS

inglese
The complete reading list wil be available on Moodle. It will comprise both book chapters and scientific papers.

Bodie Kane and Marcus ch. 5-11, 13, 24

Cochrane J., Asset Pricing, Princeton University Press, 1999, Ch.1,2, 4.1,4.2,4.3, 5.1, 5.2,5.3 .

NOTE

Course webpage: https://www.finance-insurance.unito.it/do/corsi.pl/Show?_id=8bbg

BANKING

Academic year:	2021/2022
Course ID:	SEM0063
Teachers:	Alberto Eichholzer (Lecturer)
	Giorgio Spriano (Lecturer)
	Luca Martina (Lecturer)
Teacher contacts:	alberto.eichholzer@unito.it
Degree course:	Finance
	Insurance and Statistics
Year:	1st year
Type:	Distinctive
Credits/recognition:	9
Course SSD (disciplinary sector):	SECS-P/11 - economia degli intermediari finanziari
Delivery:	Formal authority
Language:	English
Attendance:	Optional
Type of examination:	Written

PREREQUISITES

Non vi sono prerequisiti formali.

COURSE OBJECTIVES

english

Commercial Banking: to provide the students with general understanding of banking activities, products, markets, rules and basic principles of business, planning and risk management

Investment Banking: to provide the students with general understanding of infrastructure financing, market practices, analytical tools and basic principles of legal and regulatory framework

Private Banking: to provide the students with the basic of the private banking business dynamics and a picture of the main features of the sector and its new regulatory framework

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COURSE AIMS

english

Commercial Banking: students should acquire an understanding of the main banking activities and how they contribute to the asset-liabilities and profit and loss of the bank, together with the first elements of planning and risk management

Investment Banking: students should acquire the basic elements of infrastructural financing and related markets

Private Banking part students should acquire knowledge of the private banking business dynamics and have a clear picture of the geographic main features of the sector. The new regulatory framework and the role of the private banker will be emphasized and are required to be learned and understood.

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COURSE DELIVERY

english
The course is based on 63/72 hours, divided into 3 modules of 21/24 hours each: Commercial Banking, Investment Banking and Private Banking. Lesson frequency is recommended

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LEARNING ASSESSMENT METHODS

english
Every part of the course (Commercial, Corporate, Private) will assign 10/30 of the final vote.

For students attending lessons 50%-70% of the total grade (16/30) will be attributed on the basis of group a project and the other 50%-30% through a written exam, that could include both theory and exercises.

For non attendig students there will be a written exam, that could include both theory and exercises.

The exam lasts 2 hours (one hour for attending students).

The maximum grade is 30/30 cum laude (16 points, 30 cum laude).

There are 9-15 questions (with different grades, corresponding to their difficulty).

Students can withdraw until the end of the exam.
During the Covid-19 emergency the learning assessment method will consist in a written exam with video surveillance on Webex. Students are referred to the Moodle page of the course for detailed informations.

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PROGRAM

english
Commercial Banking (G. Spriano)
- The economic function and the typical activities of a Bank
- Balance sheet and profit and loss of a Bank
- Basic principles of banking planning and budgeting
- Italian and European banking system: trends and shape in the recent history
- The present regulatory framework

Investment Banking (A. Eichholzer)
- Infrastructure Financing
- Public Private Partnerships
- Project Finance
- Case Studies

Private banking (L. Martina)
- Private Banking: Definition,   History, Ranking and Global View on Regional Markets
- Value Proposition/Industry   Dynamics/ Introduction to Client Needs, Behaviors and preferences
- The Role of the Private   Banker: Behavioral Finance Basics
- Priorities for capturing the   new generation of clients/The Advisory Processes
- The Advisory Model
- Main Asset Classes Basics
- Strategy implementation, Asset Protection

italiano

SUGGESTED TEXTBOOKS AND READINGS

english
All the course materials will be provided on the website

italiano

NOTE

english
The methods of teaching activity could change in according to the limitation imposed by the current health crisis. In any case the e-learning mode is guaranteed throughout the academic year.

italiano
Le modalità di svolgimento dell'attività didattica potranno subire variazioni in base alle limitazioni imposte dalla crisi sanitaria in corso. In ogni caso è assicurata la modalità a distanza per tutto l'anno accademico.

Course webpage: https://www.finance-insurance.unito.it/do/corsi.pl/Show?_id=pdlo

COMMERCIAL LAW (ADVANCED)

COMMERCIAL LAW (ADVANCED)

Academic year:	2021/2022
Course ID:	SEM0016
Teacher:	Paolo Maria Smirne (Lecturer)
Teacher contacts:	paolomaria.smirne@unito.it
Degree course:	Finance Insurance and Statistics
Year:	2nd year
Type:	Distinctive
Credits/recognition:	6
Course SSD (disciplinary sector):	IUS/04 – diritto commerciale
Delivery:	Formal authority
Language:	English
Attendance:	Optional
Type of examination:	Oral

COURSE OBJECTIVES

english

The Class aim is providing students with instruments to understand EU company law, and financial markets law, with a specific focus on the EC rules about intermediaries, markets and issuers

italiano

L'insegnamento si propone di fornire allo studente gli strumenti per comprendere i principali istituti del diritto societario europeo e del mercato finanziario, con particolare riguardo alla disciplina comunitaria degli intermediari, del mercato e degli emittenti

COURSE AIMS

english

KNOWLEDGE AND UNDERSTANDING
We hope that students gain knowledge and understanding on the current rules of company law and financial markets law

APPLYING KNOWLEDGE AND UNDERSTANDING
We hope that students are able to properly apply the institutions of financial markets law to cases and works hypothesis

INDEPENDENT JUDGEMENT
We hope that the students gain critical skills in evaluating the answers/solutions provided to the main financial markets law issues

COMMUNICATION SKILLS

We hope that the students are able to discuss the issues and to propose solutions

LEARNING SKILLS
We hope that the students gain the methodological basis about the legal research on financial
markets law matters and are able to examine in depth the subjects discussed during the course

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CONOSCENZA E CAPACITÀ DI COMPRENSIONE
Si auspica che lo studente possa acquisire conoscenze e capacità di comprensione dei principali
istituti del diritto societario e dei mercati finanziari

CAPACITÀ DI APPLICARE CONOSCENZA E COMPRENSIONE

Si auspica che lo studente possa applicare correttamente a casi concreti semplici la disciplina
positiva dei principali istituti dei mercati finanziari

AUTONOMIA DI GIUDIZIO
Si auspica che lo studente acquisisca capacità critica nel valutare le soluzioni date alle
problematiche dai vari operatori del settore

ABILITÀ COMUNICATIVE
Si auspica che lo studente sia in grado di discutere problemi e prospettare soluzioni relativamente a
casi di studio

CAPACITÀ DI APPRENDIMENTO
Si auspica che lo studente acquisisca i fondamenti metodologici per l'applicazione dei principali
istituti del diritto dei mercati finanziari

COURSE DELIVERY

english
The course includes a series of lectures, each dedicated to one or more institutions and declined in
its illustration, followed - where appropriate - by the presentation of case law of particular
importance

italiano
L'insegnamento prevede una serie di lezioni frontali, ciascuna dedicata a uno o più istituti e
declinata nella relativa illustrazione, seguita - ove consentito dalla natura istituzionale della
trattazione - dalla presentazione di casi di particolare rilevanza

LEARNING ASSESSMENT METHODS

english
Oral examination. The examination will verify the knowledge of the main principles of EU Company
Law and Securities and Financial Market Regulation

Students must be registered to the examination and must have passed exams as provided in
Department rules. The evaluation of the examination must be recorded immediately

italiano

Esame orale. L'esame è finalizzato a verificare che lo studente abbia appreso le nozioni chiave della materia, nonché la capacità di orientarsi fra le norme

Lo studente è ammesso a sostenere l'esame solo se regolarmente iscritto all'appello; lo studente è ammesso a sostenere l'esame solo se ha rispettato le propedeuticità fissate dal regolamento; non e' in alcun modo possibile far sostenere l'esame e "conservare" il voto per una futura registrazione

SUPPORT ACTIVITIES

english

Class attendance, although not mandatory, is recommended due to the technical nature of the subject. In any case, classroom attendance must be accompanied by the study of the manual and of the papers provided

italiano

La frequenza alle lezioni, pur non obbligatoria, è consigliata in ragione del carattere tecnico della materia. In ogni caso, la frequenza in aula dev'essere accompagnata dallo studio del manuale e dei materiali consigliati

PROGRAM

english

ANALYSIS OF THE GLOBAL LEGAL AND BUSINESS ENVIRONMENT: CIVIL LAW AND COMMON LAW
THE ARCHITECTURE OF THE EU: DIFFERENT FORMS OF BUSINESS ORGANIZATIONS
DIFFERENT FORMS OF BUSINESS ORGANIZATIONS: COMPANIES
DIFFERENT FORMS OF BUSINESS ORGANIZATIONS: COMPANIES ... CAPITAL MAINTENANCE
CORPORATE GOVERNANCE: THE ORGANS OF A COMPANY
CORPORATE GOVERNANCE: THE OTHER TWO MODELS
CORPORATE FINANCE: DEBT SECURITIES
CORPORATE FINANCE: CROWDFUNDING
FINANCIAL MARKETS AND MIFID 2
CORPORATE FINANCE: THE STOCK ECHANGE
PRINCIPLES ABOUT THE BANKING SYSTEM AT ITALIAN AND EU LEVEL

italiano

SUGGESTED TEXTBOOKS AND READINGS

The Anatomy of Corporate Law

Autore: Reinier Kraakman (Autore), John Armour (Autore), Paul Davies (Autore), Luca Enriques (Autore), Henry Hansmann (Autore), Gerard Hertig (Autore), Klaus Hopt (Autore), Hideki Kanda (Autore), Mariana Pargendler (Autore), Wolf-Georg Ringe (Autore), Edward Rock (Autore)

NOTE

english

The methods of teaching activity could change in according to the limitation imposed by the current health crisis. In any case the e-learning mode is guaranteed throughout the academic year.

italiano

Le modalità di svolgimento dell'attività didattica potranno subire variazioni in base alle limitazioni imposte dalla crisi sanitaria in corso. In ogni caso è assicurata la modalità a distanza per tutto l'anno accademico.

Course webpage: https://www.finance-insurance.unito.it/do/corsi.pl/Show?_id=e00a

COMPUTER SCIENCE WITH PYTHON

COMPUTER SCIENCE WITH PYTHON

Academic year:	2021/2022
Course ID:	SEM0142
Teacher:	Gianfranco Durin (Lecturer)
Teacher contacts:	n/d, gianfranco.durin@unito.it
Degree course:	Finance Insurance and Statistics
Year:	1st year
Type:	For the final degree and for the knowledge of foreign language
Credits/recognition:	3
Course SSD (disciplinary sector):	INF/01 - informatica
Delivery:	Formal authority
Language:	English
Attendance:	Optional
Type of examination:	Oral

COURSE OBJECTIVES

english

Aim of the course is to give a basic knowledge of the Python language for financial applications. In particular, Pandas will be introduced in order to load, manipulate and do statistical analysis of financial datasets.

COURSE AIMS

english

At the end of the course, a student will be able to:

Understand the basic commands of Python and the use of Jupyter Notebooks
Load databases (online, or from Excel, csv) to manipulate and correct data, even non well formatted (data wrangling)
Basic statistical analysis and plots in different styles
Preparation of small reports of data analsys

COURSE DELIVERY

english

Traditional teaching with classroom works in small groups (max 3 people) for problem solving.

It is strongly suggested the use of a personal notebook with the Python Anaconda distribution. Instructions will be given in the Moodle page.

LEARNING ASSESSMENT METHODS

english

The students have to prepare a little code project ineherent to their activity. It is mandatory the use of a Python class with a few methods, linked from a Jupyter Notebook showing the results of their calculations.

An oral examination will allow to explain the content of the project

PROGRAM

english

The course is based on Think Python which is an classical introduction to Python programming for beginners. The book starts with basic concepts of programming, and is carefully designed to define all terms when they are first used and to develop each new concept in a logical progression. Larger pieces, like recursion and object-oriented programming are divided into a sequence of smaller steps and introduced over the course of several chapters.

A short introdution to Pandas will be given as well.

Detailed description:
- The way of the program
- Variables, expressions and statements
- Functions
- Conditional and iteration
- Strings, lists, tuples, sets and dictionaries
- Introduction to Pandas and plotting methods
- Classes and objects
- Case studies

SUGGESTED TEXTBOOKS AND READINGS

english

THe Think Python 2e can be download for free at this url: https://greenteapress.com/wp/think-python-2e/

Course webpage: https://www.finance-insurance.unito.it/do/corsi.pl/Show?_id=x91b

CORPORATE FINANCE

CORPORATE FINANCE

Academic year:	2021/2022
Course ID:	SEM0064
Teacher:	
Teacher contacts:	
Degree course:	Finance
Year:	1st year
Type:	Distinctive
Credits/recognition:	6
Course SSD (disciplinary sector):	SECS-P/09 - finanza aziendale
Delivery:	Formal authority
Language:	English
Attendance:	Optional
Type of examination:	

NOTE

english

The methods of teaching activity could change in according to the limitation imposed by the current health crisis. In any case the e-learning mode is guaranteed throughout the academic year.

italiano

Le modalità di svolgimento dell'attività didattica potranno subire variazioni in base alle limitazioni imposte dalla crisi sanitaria in corso. In ogni caso è assicurata la modalità a distanza per tutto l'anno accademico.

BORROWED FROM

CAPITAL MARKETS AND CORPORATE FINANCE - MODULO MANAGERIAL CORPORATE FINANCE (SEM0060A)

Two - Year Master Degree in Economics

Course webpage: https://www.finance-insurance.unito.it/do/corsi.pl/Show?_id=try0

DECISION AND UNCERTAINTY

DECISION AND UNCERTAINTY

Academic year:	2021/2022
Course ID:	SEM0067
Teacher:	Paolo Ghirardato (Lecturer)
	Daniele Pennesi (Lecturer)
Teacher contacts:	011 6705750, paolo.ghirardato@unito.it
Degree course:	Insurance and Statistics
Year:	1st year
Type:	Related or integrative
Credits/recognition:	6
Course SSD (disciplinary sector):	SECS-S/06 - metodi matematici dell'economia e delle scienze att. e finanz.
Delivery:	Formal authority
Language:	English
Attendance:	Optional
Type of examination:	Written

COURSE OBJECTIVES

english
 This is a course which introduces students to the formalization and analysis of decision making both in a single-person environment. While the course's emphasis is on theoretical issues, specific attention is given to the application of the concepts developed in class to economic and financial problems.

italiano

COURSE AIMS

english
 At the end of the course, the student is expected to be capable of:

-using the basic tools and results to pose, formalize and analyse a single-person or multi-person decision problem

-knowing the extent to which the results obtained in the previous step are dependent on the assumption that s/he has made about the preferences, information and behavior of actors in the problem

-knowing therefore the extent to which the results are robust to different assumptions on preferences, information and behavior

-being able to think about possible and useful generalizations of the posited model(s)

-being able to communicate such findings using appropriate and clear mathematical notation and language

italiano

COURSE DELIVERY

english

The course-work is articulated in 48 hours of formal lecture time, and in at least as many hours of at-home work solving practical exercises.

For the first 10 weeks of the semester the course will be taught in-person, but classes will also be streamed via Webex (and recorded), so that students who are not in Torino may still be able to attend and participate. In the last 2 weeks of the semester, like all of the other courses in the School, classes will only be held online. The course schedule (with venues) is the following:

THURSDAYS 10:15-13:15, Aula 9
FRIDAYS 8:15-10:15, Aula Castellino

Students who want to participate in-person will need to sign up using the "student booking" app (recall that access to the School's building requires a valid "green pass"). Students who are attending classes remotely can do so using the Webex app. Attendance in-person is however strongly advised.   Links to the Webex streams for the lectures will be posted shortly on the course's Moodle page (contact Prof. Ghirardato should you have any problem accessing it). Please do not circulate them (or any of the course's material), referring anybody who is interested in the course's lectures to Prof. Ghirardato.
italiano

LEARNING ASSESSMENT METHODS

english

Generalities:

The course grade is determined solely on the basis of written examinations. The objective of the examination is to test the student's ability to do the following:

1) Present briefly the main ideas, concepts and results developed in the course, also explaining intuitively the meaning and scope of the definitions and the arguments behind the validity of the results

2) Use effectively the concepts and the result to answer questions in Economics and related areas --e.g., using a specific decision model to make a policy prescription.

Practicalities:

There are 5 possible exam sessions in each academic year. The first session takes place during the first semester (while the course is being taught), and it is articulated in a midterm administered in early November and and a final exam administered in early December. The remaining four sessions (from January until September) comprise a single comprehensive examination. The details for each type of examination are provided below.

Midterm+Final (November+December): Each of the two exams lasts 90 minutes, and it is articulated in 2 questions. Some of the questions have an essay part, and some of the questions also have a more practical ("exercise") part. Each question is scored between 20 and 40 points, and the maximum score for the exam is typically 60. There is no minimum score in the midterm for admisssion to the final exam. Once both exams are graded, the final score in 120ths is computed, and it is transformed into 30ths, taking also into account the general class performance in the two exams (i.e, giving some weight to relative, as well as absolute performance).

Comprehensive examinations (4 sessions between June and February): Each exam lasts 165 minutes, and it is typically articulated in 4 questions. Some of the questions have an essay part, and some of the questions also have a more practical ("exercise") part. Each question is scored between 20 and 40 points, and the maximum score for the exam is typically 120. The final score in 120ths is computed, and it is transformed into 30ths, taking also into account the general class performance in the two exams (i.e, giving some weight to relative, as well as absolute performance).

italiano

SUPPORT ACTIVITIES

english
 Weekly homework sets will be assigned (to be found on the course web page, see the URL in the "Note" below), and their solution will be posted and discussed in class.

italiano

PROGRAM

english

-Introduction and overview of decision models.

-Decision analysis in action: Your decision problem

-Choice under certainty: Relations and revealed preferences

-Known probabilities: The Expected Utility Model

-Subjective probability: The Subjective Expected Utility model (Anscombe-Aumann and Savage)

-Non-expected utility models: The Allais and Ellsberg paradoxes and their rationalizations

-Dynamic choice: basic concepts

-Choice over time with no uncertainty

-Choice over time with uncertainty

italiano

SUGGESTED TEXTBOOKS AND READINGS

english
 The exam is mostly going to be based on the class notes and some readings assigned in class. However, for supplemental reading (and some homework exercises) the following are the suggested textbooks for the course:

-David Kreps, Notes on the Theory of Choice, Westwood Press, 1988, chapters 1-12

-Howard Raiffa, Decision Analysis, McGraw-Hill 1997 (1968), chapters 1-5

italiano

NOTE

For further details, please consult the course official web page:

http://sites.carloalberto.org/ghirardato/didattica/du/du.html

Course webpage: https://www.finance-insurance.unito.it/do/corsi.pl/Show?_id=oou7

DERIVATIVES

DERIVATIVES

Academic year:	2021/2022
Course ID:	ECO0207
Teacher:	Elisa Luciano (Lecturer) Dror Yossef Kenett (Lecturer) Lorenzo Schoenleber (Lecturer)
Teacher contacts:	0116705742, elisa.luciano@unito.it
Degree course:	Finance Insurance and Statistics
Year:	2nd year
Type:	Distinctive
Credits/recognition:	9
Course SSD (disciplinary sector):	SECS-S/06 - metodi matematici dell'economia e delle scienze att. e finanz.
Delivery:	E-learning
Language:	English
Attendance:	Optional
Type of examination:	Written

PREREQUISITES
math for finance

COURSE OBJECTIVES

english
The course aims at presenting the main valuation and hedging techniques for derivatives, mainly futures and options. Lab sessions for application of the theory (Excel based) are included.

italiano

COURSE AIMS

english
 Ability to evaluate and hedge the main derivative contracts on stock markets.

italiano

COURSE DELIVERY

english

lectures + lab

italiano

LEARNING ASSESSMENT METHODS

english

- The exam will be closed books, with 3 sets of exercises: Luciano (50% of the grade), Kenett (25%), Schoenleber (25%). Students will be given 2 hours. Retake of the entire exam only is possible.

italiano

SUPPORT ACTIVITIES

english
lab

italiano

PROGRAM

english

First part: from Financial Economics to Math Finance (Financial Mathematics), Fin. Math straight away
- Fundamental Pricing Theorem
- Its use for derivative assets
Second part: applications (theory and computer lab):
1. Swaps
2. Forwards and futures
2. European Options:
- Pricing, Black Scholes for stock options, fixed income options and options on futures
- Hedging: naked and covered positions, stop-loss strategies, delta and gamma hedging in discrete and continuous time
- Hedging errors and valuation of hedging strategies
3. Applications of derivative pricing to credit and counterparty risk

- Option theory in order to evaluate credit risk
- Credit derivatives

italiano

SUGGESTED TEXTBOOKS AND READINGS

english
for Prof. Luciano's part:

a) B. Dumas, E.Luciano, The Economics of Continuous-time Finance, MIT Press, 2017.

https://mitpress.mit.edu/books/economics-continuous-time-finance

b) J.Hull, Intro to derivative securities, 10th edition

italiano

NOTE

english
You can find an updated version of lectures timetable in the section "Materiali didattici".

italiano
Potete trovare l'aggiornamento dell'orario delle lezioni nella sezione "Materiali didattici".

Course webpage: https://www.finance-insurance.unito.it/do/corsi.pl/Show?_id=su87

ECONOMETRICS II

ECONOMETRICS II

Academic year:	2021/2022
Course ID:	ECO0143
Teacher:	
Teacher contacts:	
Degree course:	Finance
Year:	1st year
Type:	Distinctive
Credits/recognition:	12
Course SSD (disciplinary sector):	SECS-P/05 - econometria
Delivery:	Formal authority
Language:	English
Attendance:	Optional
Type of examination:	Oral

NOTE

english

The methods of teaching activity could change in according to the limitation imposed by the current health crisis. In any case the e-learning mode is guaranteed throughout the academic year.

italiano

Le modalità di svolgimento dell'attività didattica potranno subire variazioni in base alle limitazioni imposte dalla crisi sanitaria in corso. In ogni caso è assicurata la modalità a distanza per tutto l'anno accademico.

BORROWED FROM

ECONOMETRICS II (SEM0094)

Two - Year Master Degree in Economics

Course webpage: https://www.finance-insurance.unito.it/do/corsi.pl/Show?_id=v2ak

ECONOMICS OF SAVINGS AND PENSIONS

ECONOMICS OF SAVINGS AND PENSIONS

Academic year:	2021/2022
Course ID:	ECO0154
Teacher:	
Teacher contacts:	
Degree course:	Finance Insurance and Statistics
Year:	1st year
Type:	Related or integrative
Credits/recognition:	6
Course SSD (disciplinary sector):	SECS-P/01 - economia politica
Delivery:	Formal authority
Language:	English
Attendance:	Optional
Type of examination:	Oral

COURSE DELIVERY

NOTE

english

The methods of teaching activity could change in according to the limitation imposed by the current health crisis. In any case the e-learning mode is guaranteed throughout the academic year.

italiano

Le modalità di svolgimento dell'attività didattica potranno subire variazioni in base alle limitazioni imposte dalla crisi sanitaria in corso. In ogni caso è assicurata la modalità a distanza per tutto l'anno accademico.

BORROWED FROM

ECONOMICS OF SAVINGS AND PENSIONS - NON ATTIVATO (ECO0154)

Two - Year Master Degree in Economics

Course webpage: https://www.finance-insurance.unito.it/do/corsi.pl/Show?_id=kubo

FINANCIAL ECONOMETRICS

FINANCIAL ECONOMETRICS

Academic year:	2021/2022
Course ID:	SEM0087
Teacher:	Luca Gambetti (Lecturer)
Teacher contacts:	n/d, luca.gambetti@unito.it
Degree course:	Finance
Year:	2nd year
Type:	Related or integrative
Credits/recognition:	6
Course SSD (disciplinary sector):	SECS-P/05 - econometria
Delivery:	Formal authority
Language:	English
Attendance:	Optional
Type of examination:	Written

COURSE OBJECTIVES

english

This course provides an introduction to the econometric techniques used for the analysis of economic and financial time series. The course begins with an overview of ARMA and VARMA models, and then focuses on the nonlinear time series model used for the analysis of financial time series. In particular, the course will introduce the univariate nonlinear time series models used for the analysis of financial volatility (GARCH models) and the multivariate nonlinear models for the analysis of correlations (DCC models).

italian

COURSE AIMS

english

Students are expected to learn how to use the economeetric models discussed and to conduct individually analyses of economic and financial data.

italian

COURSE DELIVERY

english

The course consists of 48 lecture hours. Strong interaction between teachers and students is encouraged. Part of the course   will be given at the Computer Lab.

LEARNING ASSESSMENT METHODS

english
- project

- written final exam at the end of the course

italian

PROGRAM

english
0. User's Guide

 1. Intro to Times Series

1.1. Time Series in Economics and Finance

1.2. Time Series as Stochastic Processes

1.3. Time Series Properties

2. Univariate Linear Time Series (ARMA)

2.1. Linear Time Series: Models

2.2. Linear Time Series: Prediction

2.2 Linear Time Series: Estimation

2.4. Linear Time Series: Practice

3. Multivariate Linear Time Series (VARMA)

3.1. Linear Time Series: Models

3.2. Linear Time Series: Prediction

3.3. Linear Time Series: Estimation

3.4. Linear Time Series: Practice

4. Volatility Modeling

4.1. Volatility Modeling: ARCH and GARCH

4.2. Volatility Modeling: Asymmetric Effects

4.3. Volatility Modeling: Prediction and Evalution

4.4. *Volatility Modeling: Stochastic Volatility

4.5. *Volatility Modeling: High Frequency Data Based Volatility Modelling

5. Covariance Modeling

5.1. Multivariate Volatility Models

6. Nonlinear Time Series Models

6.1 TVAR

6.2 STVAR

6.3 TVC-VAR

italian

SUGGESTED TEXTBOOKS AND READINGS

english

italian

Course webpage: https://www.finance-insurance.unito.it/do/corsi.pl/Show?_id=msxk

FIXED INCOME

FIXED INCOME

Academic year:	2021/2022
Course ID:	SEM0021
Teacher:	Marina Marena (Lecturer)
	Luca Martina (Lecturer)
	Andrea Roncoroni (Lecturer)
Teacher contacts:	0116705752, marina.marena@unito.it
Degree course:	Finance
	Insurance and Statistics
Year:	2nd year
Type:	Distinctive
Credits/recognition:	6
Course SSD (disciplinary sector):	SECS-S/06 - metodi matematici dell'economia e delle scienze att. e finanz.
Delivery:	Formal authority
Language:	English
Attendance:	Optional
Type of examination:	Written

PREREQUISITES

Financial mathematics (for part 1 and 2), stochastic calculus and basics of derivative pricing (for part 2).

COURSE OBJECTIVES

English
 The purpose of the course is to discuss:

1) how to construct and manage a fixed-income portfolio

2) how to model the term structure of interest rates

3) how to price and hedge interest rate derivatives

Fundamental mathematical tecniques will be presented. Practical applications will be greatly discussed.

COURSE AIMS

English
At the end of the course, the student is expected to be capable of:

    understanding fixed-income markets and instruments
    evaluating the impact of the determinants of interest rate movements
    constructing and maintaining a fixed-income portfolio, and assessing its credit risk

constructing interest rate curves from marked data

pricing and hedging interest rate derivatives

applying the basic course knowledge to theoretical issues and concrete market situations

approaching the subject in a critical manner through the examination of different approaches in the literature and practice of the fixed-income market

having gained communication skills, through the debate during the lectures

having gained learning abilities, through a variety of learning tools (teaching material, class discussion, lab sessions, homework and tests)

COURSE DELIVERY

English

Lectures, class discussion and lab sessions.

Slides and other course material will be made available on Moodle in due time.

LEARNING ASSESSMENT METHODS

English

Written exam 80% (24 points), homeworks and group project, 20% (6 points). The written exam is a closed-book exam lasting 2 hours. Homeworks and projects must be uploaded on Moodle. Deadlines will be posted on Moodle.

SUPPORT ACTIVITIES

Compulsory homeworks will be assigned. Deadlines will be posted on Moodle.

PROGRAM

English

Part 1 [Martina, 16 hours]

BOND ANALYSIS:
- Bond definition and characteristics
- Bond types
- Bond structure and priority
- Bond valuation
- Bond Return Measures (CY, YTM, YTC)
- Yield curve
- The effect of interest rate changes on bond prices
- Duration
- Determinants of Interest Rates
- Bond ratings and CRAs
- Bond spread
- Bond Yields
- Government Bonds

PORTFOLIO MANAGEMENT:
- Portfolio competition and market/strategy comments

Part 2 [Marena, 16 hours]

INTEREST RATES DERIVATIVES: PRODUCTS AND MARKET MODELS
- Spot and forward contracts
- Taxonomy of rates
- Interest rate linear derivatives
- FRA and swaps
- Bootstrapping/interpolating the interest rate curve
- Interest rate options
- Options on bonds
- Caps and floors
- Swaptions
- The change of measure technique
- Market models:
- The Black model
- Market models
- Beyond Black's model
- Hedging interest rate risk
REFERENCES
Björk, T.. Arbitrage theory in continuous time, OUP, 2009
Brigo, D., Mercurio, F., Interest Rate Models: Theory and Practice With Smile, Inflation and Credit, Springer, 2006.
Kienitz, J., 2013&2017. Interest rates explained 1&2, Palgrave

Part 3 [Roncoroni, 16 hours]

INTEREST RATES DERIVATIVES AND SHORT RATE MODELS

Part I: Linear Interest Rate Derivatives.

1. Time value
- Time measurement
- Accrual and discount factors
- Properties

2. Interest Rates
- Interest as a frequency
- Simple, discrete, and continuously compounding
- Forward time value and rates

3. Linear Derivatives
- Definition and classes
- Single payment: Zero, floating rate bond, forward rate agreement
- Multiple payments: coupon bonds, floating rate note, swap

4. Training on Interest Rate Calculus
- Selected exercises (with solution)

Part II: Nonlinear Interest Rate Derivatives.

1. Nonlinear Derivatives
- Definition
- Bond options,
- Cap(let), floor(let), swaption

2. Reduction to Bond Options
- Jamshidian trick
- Application to swaption
- Caplet as a put option on a zero

3. Change of Numéraire
- Problem statement and solution heuristics
- Mathematical prerequisites: Change of measure, abstract Bayes' theorem, Girsanov theorem
- Change of numéraire: technique and effect on Itô dynamics; Example: the forward measure

4. Option Pricing under Stochastic Time Value
- The pricing problem
- General option pricing formula
- Geman-El Karoui-Rochet formula

Part III: Short Rate Modeling

1. Arbitrage-Free Bond Markets Generated by a Short Rate Model.
- Portfolio dynamics and risk premium condition
- Pricing function indeterminacy
- Risk neutral expectation formula

2. Affine Bond Market and Short Rate Models
- Definition and characterization of affine term structures
- Application I: Model calibration to a quoted discount function
- Application II: Zero-coupon bond option pricing

3. The Hull-White Model: Calibration and ZBO Pricing
- Model definition
- Calibration to the quoted term structure
- Bond option formula

4. Introduction to Forward Rate Curve Modeling (time permitting)
- Interest rate relations
- The Heath-Jarrow-Morton framework
- Pricing with a HJM model

REFERENCES

Björk, T., Arbitrage Theory in Continuous Time (3rd ed.), Oxford University Press, 2009.
Brigo, D., Mercurio, F., Interest Rate Models: Theory and Practice, Springer Finance, 2006.
Roncoroni, A., Fixed Income Lecture Notes 1-3, 2021.

SUGGESTED TEXTBOOKS AND READINGS

English
Material and lecture notes will be made available via Moodle.

References for FIXED INCOME DERIVATIVES:
- Björk, T.. Arbitrage theory in continuous time, OUP, 2009
- Brigo, D., Mercurio, F., Interest Rate Models: Theory and Practice With Smile, Inflation and
Credit, Springer, 2006.
- Kienitz, J., 2013&2017. Interest rates explained 1&2, Palgrave

NOTE

English
 The course should be taken together with "Derivatives". Students who cannot attend classes are
kindly requested to contact instructors at the beginning of the course.

Course webpage: https://www.finance-insurance.unito.it/do/corsi.pl/Show?_id=zlte

ITALIAN FOR INTERNATIONAL STUDENTS BEGINNER LEVEL

ITALIAN FOR INTERNATIONAL STUDENTS BEGINNER LEVEL

Academic year:	2021/2022
Course ID:	LIN0592
Teacher:	
Teacher contacts:	
Degree course:	Generic
Year:	1st year
Type:	Elective
Credits/recognition:	3
Course SSD (disciplinary sector):	NN/00 - nessun settore scientifico
Delivery:	Blended
Language:	Italian
Attendance:	Obligatory
Type of examination:	Written and oral

PREREQUISITES

english

Absolute beginners in Italian will have to take an extra e-learning module on the IcoN platform before they start the course. Additional information will be available on the Language Centre (CLA-UniTO) website www.cla.unito.it

italiano

I principianti assoluti dovranno svolgere il pre-corso online in autoapprendimento sulla piattaforma IcoN. Le istruzioni saranno pubblicate sul sito del CLA-UniTO www.cla.unito.it

COURSE OBJECTIVES

english

The course "Comunicare in italiano" is meant to welcome the international students and help them feel at ease in the Italian cultural and linguistic context. The course is organized by the University Language Center (CLA-UniTO) and it is composed of 2 yearly levels (Beginner and Intermediate). Students who successfully complete the course will be entitled to ECTS credits and to an "Open Badge", that is to say, a digital certificate stating the CEFR level and the skills acquired. They will then be able to access the course "ITALIAN FOR INTERNATIONAL STUDENTS INTERMEDIATE LEVEL SSD NN" in the subsequent academic year.

italian

Il corso "Comunicare in italiano" si configura come una forma di accoglienza per facilitare l'inserimento nel contesto culturale italofono ed è composto da due annualità. È ideato e realizzato dal Centro Linguistico di Ateneo (CLA-UniTO) e ha come obiettivo la formazione linguistica e culturale in italiano per gli studenti internazionali al primo anno dei corsi di laurea triennali, magistrali e a ciclo unico erogati in inglese. Oltre ai CFU, gli studenti potranno ottenere un "Open Badge" digitale con indicazione del livello linguistico raggiunto secondo il QCER e il dettaglio delle competenze acquisite. Gli studenti che hanno concluso con successo questa formazione potranno nell'anno accademico successivo accedere al corso "ITALIAN FOR INTERNATIONAL STUDENTS INTERMEDIATE LEVEL SSD NN"

COURSE AIMS

Students are expected to:

> develop communication skills in Italian in order to feel at ease with everyday life in Italy
> learn the main vocabulary, morpho-syntactic structures and phonological features of Italian at a pre-intermediate level (CEFR A2)
> acquire basic intercultural skills

italian

> sviluppare competenze comunicative in italiano tali da potersi relazionare adeguatamente in situazioni di vita quotidiana
> acquisire il lessico e le principali strutture morfo-sintattiche e fonetiche dell'italiano ad un livello pre-intermedio (A2 del QCER)
> acquisire una competenza interculturale di base

COURSE DELIVERY

english
It will be an 80-hour blended course:

> module 1: 40 hours (30 hours of synchronous teaching + 10 hours of asynchronous learning)
> module 2: 40 hours (30 hours of synchronous teaching + 10 hours of asynchronous learning)

Synchronous teaching will take place in person or through the WebEx platform. Asynchronous learning will take place mainly through the ICoN and Moodle platform. Cultural activities and extra meetings with Italian intern students will be part of the course as well.

italian
Il corso sarà erogato in modalità blended in due moduli per un totale di 80 ore:

> modulo 1: 40 ore (30 ore di didattica sincrona + 10 ore asincrone)
> modulo 2: 40 ore (30 ore di didattica sincrona + 10 ore asincrone)

L'insegnamento sincrono sarà erogato in presenza oppure su piattaforma Webex. Per l'apprendimento asincrono saranno utilizzate le piattaforme Moodle e ICoN. Verranno proposti incontri e attività culturali con gli studenti tirocinanti del CLA.

LEARNING ASSESSMENT METHODS

english
Mandatory. Min. 75% of attendance for synchronous teaching is required in order to be eligible for the final exam

> mid-term test at the end of the first module
> final exam at the end of the year: a written task and an oral task.

Teachers will provide more information during the course.

italian
Per accedere all'esame è necessario aver frequentato almeno il 75% delle lezioni sincrone.

> verifica intermedia (esonero) alla fine del primo modulo
> esame di fine anno: consiste in una prova scritta ed una prova orale i cui contenuti saranno

comunicati dal docente

SUPPORT ACTIVITIES

english
Information will be provided at the beginning of the course

italian
I materiali saranno comunicati dall'insegnante a inizio corso

PROGRAM

english
Students will be divided into homogeneous groups according to their starting level in Italian, as well as to their area of study (science or humanities). The course will be composed of 2 modules of General Italian. Students will take a mid-term test at the end of the first module and a final exam at the end of the year.

italian
Gli studenti saranno suddivisi in classi omogenee in base al livello linguistico di partenza e all'area di studio del proprio corso di laurea (scientifico o umanistico). Il corso sarà articolato in due moduli consecutivi di Italiano generale. Sarà proposto un esonero sotto forma di verifica intermedia alla fine del primo modulo e un esame di fine anno.

SUGGESTED TEXTBOOKS AND READINGS

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NOTE

english
These courses are starting in January. For the undergraduate students, courses may also start in November. Detailed information about the calendar and enrolments will be available at www.cla.unito.it

italian
Il corso inizia a gennaio. Per gli studenti delle lauree triennali è possibile che vengano avviati corsi anche da novembre. Le informazioni e le modalità di iscrizione saranno rese note su www.cla.unito.it

Course webpage: https://www.finance-insurance.unito.it/do/corsi.pl/Show?_id=ktkd

ITALIAN FOR INTERNATIONAL STUDENTS INTERMEDIATE LEVEL

ITALIAN FOR INTERNATIONAL STUDENTS INTERMEDIATE LEVEL

Academic year:	2021/2022
Course ID:	LIN0593
Teacher:	
Teacher contacts:	
Degree course:	Generic
Year:	1st year
Type:	Elective
Credits/recognition:	3
Course SSD (disciplinary sector):	NN/00 - nessun settore scientifico
Delivery:	Blended
Language:	Italian
Attendance:	Obligatory
Type of examination:	Written and oral

PREREQUISITES

english

Students must have scored at least the A2 level at the placement test, or they must have completed the course "Italian for International Students Beginner Level".

italian

Aver ottenuto un livello almeno A2 nel test di livello iniziale oppure aver completato il corso "Italian for International Students Beginner Level"

COURSE OBJECTIVES

english

The course "Comunicare in italiano" is meant to welcome the international students and help them feel at ease in the Italian cultural and linguistic context. The course is organized by the University Language Center (CLA-UniTO) and it is composed of 2 yearly levels (Beginner and Intermediate). Students who successfully complete the course will be entitled to ECTS credits and to an "Open Badge", that is to say, a digital certificate stating the CEFR level and the skills acquired.

italian

Il corso "Comunicare in italiano" si configura come una forma di accoglienza per facilitare l'inserimento nel contesto culturale italofono ed è composto da due annualità (Beginner e Intermediate). È ideato e realizzato dal Centro Linguistico di Ateneo (CLA-UniTO) e ha come obiettivo la formazione linguistica e culturale in italiano per gli studenti internazionali al primo anno dei corsi di laurea triennali, magistrali e a ciclo unico erogati in inglese. Oltre ai CFU, gli studenti potranno ottenere un "Open Badge" digitale con indicazione del livello linguistico raggiunto secondo il QCER e il dettaglio delle competenze acquisite.

COURSE AIMS

english
Students are expected to:

develop communication skills in Italian in order to easily manage everyday life in Italy

learn the main vocabulary, morpho-syntactic structures and phonological features of Italian at an intermediate level (CEFR B1)

acquire good intercultural skills

italian

sviluppare competenze comunicative in Italiano tali da potersi relazionare con discreta disinvoltura in situazioni di vita quotidiana e nel contesto accademico di UniTo

acquisire il lessico e le principali strutture morfo-sintattiche e fonetiche dell'italiano ad un livello intermedio (B1 del QCER)

acquisire una buona competenza interculturale

COURSE DELIVERY

english

It will be an 60-hour blended course:

module 1: 40 hours (20 hours of synchronous teaching + 20 hours of asynchronous learning)

module 2: 20 hours (8 hours of synchronous teaching + 12 hours of asynchronous learning)

Synchronous teaching will take place in person or through the WebEx platform. Asynchronous learning will take place mainly through the ICoN and Moodle platform. Cultural activities and extra meetings with Italian intern students will be part of the course as well.

italian

Il corso sarà erogato in modalità blended in due moduli per un totale di 60 ore:

modulo 1: 40 ore (20 ore di didattica sincrona + 20 ore asincrone)

modulo 2: 20 ore (8 ore di didattica sincrona + 12 ore asincrone)

L'insegnamento sincrono sarà erogato in presenza oppure su piattaforma Webex. Per l'apprendimento asincrono saranno utilizzate le piattaforme Moodle e ICoN. Verranno proposti incontri e attività culturali con gli studenti tirocinanti del CLA.

LEARNING ASSESSMENT METHODS

english

Mandatory. Min. 75% of attendance for synchronous teaching is required in order to be eligible for the final exam.

mid-term test at the end of the first module

final exam at the end of the year: a written task and an oral task.

Teachers will provide more information during the course

italian

Per accedere all'esame è necessario aver frequentato almeno il 75% delle lezioni sincrone.

verifica intermedia (esonero) alla fine del primo modulo

esame di fine anno: consiste in una prova scritta ed una prova orale i cui contenuti saranno comunicati dal docente

SUPPORT ACTIVITIES

Information will be provided at the beginning of the course.

italian
I materiali saranno comunicati dall'insegnante a inizio corso

PROGRAM

english
Students will be divided into homogeneous groups according to their starting level in Italian, as well as to their area of study (science or humanities). The course will be composed of a module of General Italian and a module of "Italiano Plus" to improve writing and speaking skills in the academic context. Students will take a mid-term test at the end of the first module and a final exam at the end of the year.

italian
Gli studenti saranno suddivisi in classi omogenee in base al livello linguistico di partenza e all'area di studio del proprio corso di laurea (scientifico o umanistico). Il corso sarà articolato in due moduli consecutivi: italiano generale e italiano plus mirato all'interazione scritta e orale in ambito accademico. Sarà proposto un esonero sotto forma di verifica intermedia alla fine del primo modulo e un esame di fine anno.

SUGGESTED TEXTBOOKS AND READINGS

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NOTE

english
These courses are starting in January. For the undergraduate students, courses may also start in November. Detailed information about the calendar and enrolments will be available at www.cla.unito.it

italian
Il corso inizia a gennaio. Per gli studenti delle lauree triennali è possibile che vengano avviati corsi anche da novembre. Le informazioni e le modalità di iscrizione saranno rese note su www.cla.unito.it

Course webpage: https://www.finance-insurance.unito.it/do/corsi.pl/Show?_id=fr0n

LIFE AND NON-LIFE INSURANCE TECHNIQUES

LIFE AND NON-LIFE INSURANCE TECHNIQUES

Academic year:	2021/2022
Course ID:	SEM0020
Teacher:	Gabriele Pieragnoli (Lecturer)
	Danilo Guido Squillia (Lecturer)
Teacher contacts:	gabriele.pieragnoli@unito.it
Degree course:	Insurance and Statistics
Year:	1st year
Type:	Distinctive
Credits/recognition:	12
Course SSD (disciplinary sector):	SECS-S/06 - metodi matematici dell'economia e delle scienze att. e finanz.
Delivery:	Formal authority
Language:	English
Attendance:	Optional
Type of examination:	Written and oral

COURSE OBJECTIVES

english

The main purpose is to introduce Life and Non-Life insurance methodologies, techniques and practices used in the insurance industry for different reporting and valuation activities, with evidence on the trends and evolution expected for the changing regulation and environment.

italiano

L'obiettivo principale e' l'introduzione delle prassi, delle tecniche e delle metodologie quantitative usate nell'industria assicurativa per le varie attività valutative e di produzione di reportistica, con evidenza sulle tendenze e sui cambiamenti attesi nell'impianto regolamentare in evoluzione.

COURSE AIMS

english
Knowledge and understanding

Basic knowledge of methodologies and techniques adopted in the insurance regulation, and understanding of the main differences in different pieces of reporting for insurance companies.

Applying knowledge and understanding

Ability to perform basic exercises in order to quantify the technical items within different reportings (Financial Statements and Supervisory Reporting) for insurance companies.

Making judgements

Attendees will be able to identify main risk and value aspects related to insurance portfolios, being also able to distinguish basic situation of different levels of risk and value for insurers.

Communication skills

Participants will be able to describe the overall framework and the valuation principles of different reporting schemes, with reference to the risk and value for insurers.

Learning skills

The students will improve their ability to understand different sets of valuation criteria in different frameworks, depending on the purpose of each reporting framework.

italiano
Conoscenza e comprensione

Conoscenza di base delle metodologie e delle tecniche adottate nell'impianto regolamentare assicurativo, e comprensione delle principali differenze tra le diverse reportistiche delle compagnie.

Applying knowledge and understanding

Abilita' nell'eseguire esercizi di base per la quantificazione delle voci tecniche all'interno della reportistica (di Bilancio e di Vigilanza) per le compagnie assicurative.

Making judgements

I Partecipanti saranno in grado di identificare i principali aspetti relative al rischio ed al valore dei portafogli assicurativi, riuscendo a distinguere, in situazioni elementarim diversi livelli di rischio e di valore per le compagnie assicurative.

Communication skills

I partecipanti saranno in grado di descrivere, in modo semplificato, l'impianto ed i principi valutativi sottostanti i diversi schemi di reportistica per il rischio ed il valore delle compagnie assicurative.

Learning skills

Gli studenti miglioreranno la loro capacità di comprendere diversi set di criteri valutativi per finalità diverse, in dipendenza dell'utilizzo dei vari schemi di reporting.

COURSE DELIVERY

english
Lectures, classroom exercises and workshops

italiano

Lezioni frontali, esercitazioni e casi studio interattivi

LEARNING ASSESSMENT METHODS

english

the exams which will be held during Summer 2020 session will have a written and an oral part. Both of the parts will be done using Microsoft Teams Meeting. It is fundamental that you have the <u>videocamera turned on during the whole exam,</u> in order to allow to the exam commission to verify the correct proceedings of the exam. The duration of the written part is 1.5 hours, while for the oral part 0.5 hours. The weight of the two parts for the assessment grade is 50% and 50%, with a minimum requirement of sufficient grade in both parts. For each of the parts the sufficient grade is 18/30, while the maximum grade is 30/30. The final grade wil be defined as an average of the grade of the two parts.

italiano

the exams which will be held during Summer 2020 session will have a written and an oral part. Both of the parts will be done using Microsoft Teams Meeting. It is fundamental that you have the <u>videocamera turned on during the whole exam,</u> in order to allow to the exam commission to verify the correct proceedings of the exam. The duration of the written part is 1.5 hours, while for the oral part 0.5 hours. The weight of the two parts for the assessment grade is 50% and 50%, with a minimum requirement of sufficient grade in both parts. For each of the parts the sufficient grade is 18/30, while the maximum grade is 30/30. The final grade wil be defined as an average of the grade of the two parts

SUPPORT ACTIVITIES

english

italiano

PROGRAM

english
-        Introduction to regulation for Financial Statements and Supervisory Reporting.

-        Market consistent valuations in Life: European Embedded Value (overview on published principles), Market Consistent Embedded Value (principles, valuations under the risk-neutral framework, the analysis of movements), the treatment of profit sharing rules.

-        Market valuation of technical provisions in Non-Life: claims provisions (overview of deterministic and stochastic valuation approaches), premiums provisions (simplified and analytical approaches), catastrophe risks (expectations and related provisions).

- Solvency II: from Solvency I to Solvency II, standards and requisites for Internal Model, Pillar I (valuation of assets and liabilities, calculation of Solvency Capital Requirement, Loss Absorbing Capacity of Technical Provisions, the aggregation of capital charges of different lines of business: use of variance-covariance matrix and other approaches, Undertaking Specific Parameters), Pillar II (system of governance, Own risk and solvency assessment), Pillar III (Quantitative Reporting Template, Report to Supervisor, Solvency and Financial Condition Report).

- International Financial Reporting Standards: the product classification (definition of insurance risk, significant insurance risk, the discretionary participation features), shadow accounting (definition and objective under Phase 1), liability adequacy testing (framework methodology, assumptions, the Guidelines from professional bodies), IFRS 17 (the new measurement framework: IFRS 17, MCEV, Solvency II, the proposed building blocks for measuring insurance liabilities).

italiano
- ; Introduzione alla normativa per la reportistica di Bilancio e di Vigilanza dell'industria assicurativa.

- Valutazioni Market consistent nel Vita: European Embedded Value (panoramic sui principi pubblicati), Market Consistent Embedded Value (principi, valutazioni in condizioni di neutralità al rischio, analisi dei movimenti), trattamento deei meccanismi di partecipazione agli utili.

- Valutazione "a mercato" delle riserve tecniche nel Danni: riserve sinistri (panoramic degli aprocci valutativi deterministici e stocastici), riserve premi (approcci semplificati ed analitici), rischi catastrofali (cenni sulle aspettative e relative riserve).

- Solvency II: da Solvency I a Solvency II nell'industria assicurativa, standard e requisiti per i Modelli Interni, Primo Pilastro (valutazione di attività e passività, calcolo del Solvency Capital Requirement, capacità di mitigazione delle perdite delle riserve tecniche, aggregazione dei capitali di rischio di diverse line di business: uso delle matrici di varianza-covarianza ed approcci alternativi, Undertaking Specific Parameters), Secondo Pilastro (sistema di governance, ORSA: Own risk and solvency assessment), Terzo Pilastro (QRT: Quantitative Reporting Template, RTS: Report to Supervisor, SFCR: Solvency Financial Condition Report).

- Principi contabili internazionali IFRS: classificazione dei prodotti (definizione di rischio assicurativo, rischio assicurativo significativo, partecipazione discrezionale agli utili), shadow accounting (definizione e obiettivi nell'ambito della Prima Fase), test di adeguatezza delle riserve (impianto metodologico, ipotesi, linee guida dagli organismi professionali), IFRS 17 (il nuovo impianto valutativo: IFRS 17, MCEV, Solvency II, le componenti fondamentali per la misurazione delle passività assicurative).

SUGGESTED TEXTBOOKS AND READINGS

english
Notes produced by the teacher and reference material reported during the lessons.

italiano

Materiale formativo prodotto dal docente e materiale indicato durante le lezioni.

NOTE

The course will be delivered by the teacher, in cooperation with lecturers and professionals of relevant industry experience

- 50 -

Course webpage: https://www.finance-insurance.unito.it/do/corsi.pl/Show?_id=cvph

MATHEMATICS FOR FINANCE

MATHEMATICS FOR FINANCE

Academic year:	2021/2022
Course ID:	SEM0065
Teacher:	Tiziano De Angelis (Lecturer) Bertrand Lods (Lecturer)
Teacher contacts:	n/d, tiziano.deangelis@unito.it
Degree course:	Finance Insurance and Statistics
Year:	1st year
Type:	Distinctive
Credits/recognition:	12
Course SSD (disciplinary sector):	SECS-S/06 - metodi matematici dell'economia e delle scienze att. e finanz.
Delivery:	Blended
Language:	English
Attendance:	Optional
Type of examination:	Written

PREREQUISITES

english

A good knowledge of basic calculus (Matematica Generale), of the foundations of probability calculus and statistical infererence (Statistica)

COURSE OBJECTIVES

english

This course is aimed at introducing and developing many of the mathematical tools which are used in applied finance and insurance. In this module, particular stress will be posed on the development of the measure theoretical tools and advanced probability concepts with emphasis on their applications to investment and insurance decisions. The introduction of stochastic processes and their properties is always motivated by the wish to develop models for observed phenomena.

COURSE AIMS

english

At the end of the course, the student is expected to be capable of:

    using the basic tools and results to pose, formalize and solve a probability problem of applied interest
    knowing the extent to which the results obtained in the previous step are dependent on the assumption that s/he has made about the behaviour of the economic agents
    being able to think about possible and useful generalizations of the model
    being able to communicate such findings using appropriate and clear mathematical notation and language
    applying the basic course knowledge to theoretical issues and situations
    approaching the subject in a critical manner through the examination of different approaches in the literature and practice of mathematical finance

having gained communication skills, through class discussion
having gained learning abilities, through a variety of learning tools (teaching material, class discussion, lab sessions, homeworks and tests)

COURSE DELIVERY

english

The course is articulated in 96 hours of formal in-class lecture time, and in at least as many hours of at-home work solving practical exercises.

LEARNING ASSESSMENT METHODS

english

The course grade is determined solely on the basis of a written examination. The examination tests the student's ability to do the following:

- Present briefly the main ideas, concepts and results developed in the course, also explaining intuitively the meaning and scope of the definitions and the arguments behind the validity of the results
- Use effectively the concepts and the results to answer questions in basic measure theory and stochastic process theory, e.g., computing the Ito integral of some given stochastic process.

The above is accomplished by asking the student to answer open questions: 2-4 questions on part 1 (12.5 marks), 2-4 questions on part 2 (17.5 marks). Questions can be essay questions or exercises. The minimum exam grade is 18/30, the maximum grade is 30/30 cum laude. More details on the exam can be found on Moodle.

The exam is a closed-book exam lasting 2.5 hours. Use of calculators is not permitted.

The student can take the exam at most three times per academic year on a total of five exam sessions (December, January, February, June and September).

SUPPORT ACTIVITIES

english

Short course on "Essentials of Mathematics" held in September.

PROGRAM

english

The course is divided into two parts:

Part 1 [48 hours]: Probability with martingales (De Angelis)

Review of differential and integral calculus
Introduction to measure spaces
Events and random variables

Independence

Introduction to Lebesgue integrals

Expectation and L^p spaces

Product measure and Fubini's theorem

Conditional expectation

Elements of martingale theory

Applications: Black-Scholes model in discrete time

Part 2 [48 hours] : Stochastic Processes (De Angelis-Lods)

Brownian motion

Stochastic calculus

Connection with PDEs

Change of measure

Introduction to jump processes

SUGGESTED TEXTBOOKS AND READINGS

english

The following are the required textbooks for the course:

Part 1

D. Williams (1991). Probability with Martingales. Cambridge University Press.

Part 2

Shreve (2004). Stochastic calculus for finance II, Springer.

Oksendal (2003). Stochastic differential equations: an introduction with applications, Springer

Books may be avaiable from the School library's online resources:

https://www.bem.unito.it/it/che-cosa-cerchi/testi-desame-e-altri-materiali-did attici

italiano

Testi consigliati:

Part 1

D. Williams (1991). Probability with Martingales. Cambridge University Press.

Part 2

Shreve (2004). Stochastic calculus for finance II, Springer.

Oksendal (2003). Stochastic differential equations: an introduction with applications, Springer

I testi potrebbero essere reperibili dall'archivio digitale della biblioteca:

https://www.bem.unito.it/it/che-cosa-cerchi/testi-desame-e-altri-materiali-did attici

NOTE

english

The methods of teaching activity could change in according to the limitation imposed by the current health crisis.

italiano

Le modalità di svolgimento dell'attività didattica potranno subire variazioni in base alle limitazioni imposte dalla crisi sanitaria in corso.

Course webpage: https://www.finance-insurance.unito.it/do/corsi.pl/Show?_id=8quu

italiano

Le modalità di svolgimento dell'attività didattica potranno subire variazioni in base alle limitazioni imposte dalla crisi sanitaria in corso.

Course webpage: https://www.finance-insurance.unito.it/do/corsi.pl/Show?_id=8quu

MATHEMATICS FOR INSURANCE

MATHEMATICS FOR INSURANCE

Academic year:	2021/2022
Course ID:	ECO0166
Teacher:	Elena Vigna (Lecturer)
Teacher contacts:	0116705754, elena.vigna@unito.it
Degree course:	Insurance and Statistics
Year:	1st year
Type:	Distinctive
Credits/recognition:	6
Course SSD (disciplinary sector):	SECS-S/06 - metodi matematici dell'economia e delle scienze att. e finanz.
Delivery:	Formal authority
Language:	English
Attendance:	Optional
Type of examination:	Written

PREREQUISITES

English

Students should be familiar with calculus, financial mathematics, and probability theory

italiano

Lo studente dovrebbe possedere i concetti di base dell'analisi matematica, del calcolo finanziario e del calcolo delle probabilità.

COURSE OBJECTIVES

english

The main purpose is to introduce Insurance Mathematics, both life and non-life. In particular, a variety of life insurance products are illustrated and the fundamentals tools of actuarial mathematics are provided and used for the calculation of their fair premiums and mathematical reserves. The pricing process of insurance products is illustrated via different loading principles, the claim assessment is illustrated via different claim functions. The goal of the course is to make students familiar with insurance products and their modelling, and with the tools of actuarial mathematics used for the calculation of premiums and reserves.

italiano

Il corso si propone di fornire le tecniche di base della matematica per le assicurazioni, sia nel ramo vita sia nel ramo danni. In particolare, vengono introdotti e approfonditi diversi prodotti assicurativi così come gli strumenti fondamentali della matematica attuariale utilizzati per il calcolo dei loro premi puri e delle loro riserve matematiche. La costruzione del premio di tariffa viene illustrato tramite diversi modelli di caricamento di sicurezza dei premi, il calcolo dell'indennizzo è illustrato con diverse funzioni di definizione dell'indennizzo. Obiettivo del corso è far familiarizzare lo studente con diversi prodotti assicurativi e la loro modellizzazione, e con gli strumenti della matematica attuariale per il calcolo dei loro premi e delle loro riserve.

COURSE AIMS

english

At the end of the course the student should be able to:

- master basic techniques and tools of actuarial mathematics;

- make use of such techniques and tools to calculate pure premiums and reserves for life insurance products;

- master basic stochastic models for collective claim in non-life insurance;

- make use of those models to calculate expectation and variance of the total claim amount for a non-life insurance portfolio;

- calculate loaded premiums using different loading principles and claim functions;

- calculate the reinsurer's share of the claims when a reinsurance treaty takes place.

The acquired skills will form the basic background for insurance problems and will allow students to complete and deepen their knowledge in more advanced profession-focused courses. Eventually, students will have the necessary background required in workplaces where actuarial and insurance problems are tackled.

italiano

Al termine del corso, lo studente deve essere in grado di:

- padroneggiare le tecniche e gli strumenti di base della matematica attuariale;

- utilizzare tali tecniche e strumenti per il calcolo di premi puri e riserve matematiche di prodotti caso vita;

- conoscere i modelli stocastici di base per la copertura di sinistri del ramo danni;

- utilizzare tali modelli per il calcolo del valore atteso e della varianza dell'ammontare totale danni del portafoglio;

- calcolare premi caricati utilizzando diversi principi di calcolo del caricamento;

- calcolare l'ammontare pagato dal riassicuratore quando un trattato di riassicurazione è stato stipulato.

Le abilità acquisite permettono allo studente di completare la propria preparazione nei diversi aspetti della pratica assicurativa, inserendosi proficuamente in ogni ambiente di lavoro rivolto ai problemi attuariali e assicurativi.

COURSE DELIVERY

english

48 hours of front lectures, that includes theory and class work assignment.

italiano

48 ore di lezioni frontali. Oltre alla teoria vengono assegnati e corretti esercizi.

LEARNING ASSESSMENT METHODS

english

Written exam, that includes both theory and exercises. The exam lasts 3 hours. The minimum exam grade is 18/30, the maximum grade is 30/30 cum laude. There are 5-7 open questions (each grades 4-5 points), and 4-5 questions with multiple answers (each grades 1.2-1.5 points). Students can withdraw until the end of the exam.

EXAMS PROCEDURE IN WINTER AND SUMMER SESSION 2020/21 DURING COVID-19 OUTBREAK
The exam in December 2020 will be held at distance online using Webex (for audio and video communication among students and teacher) and Moodle for the exam paper. The exam in January, February and June 2021 will be held in presence. Some categories of students will be allowed to take the exam online. More info in the file "Rules exam Mathematics for Insurance, Summer Session 2020/21" posted on Moodle platform.

italiano

Esame scritto, che comprende sia teoria sia esercizi. Durata dell'esame: 3 ore. Il voto dell'esame è in trentesimi, il voto minimo è 18/30, il massimo è 30/30 con lode. Vi sono 5-7 domande aperte (ognuna vale 4-5 punti), e 4-5 domande a risposta multipla (ognuna vale 1.2-1.5 punti). Gli studenti possono ritirarsi fino alla fine.

MODALITA' DI VERIFICA NELLA SESSIONE INVERNALE 2020/21 A SEGUITO DELL'EMERGENZA SANITARIA COVID-19

L'esame di dicembre 2020 si svolgerà in modalità online a distanza attraverso l'uso delle piattaforme Webex (per il collegamento audio e video tra docenti e studenti) e Moodle (per la somministrazione della prova di esame).

Gli esami di gennaio e febbraio 2021 si svolgeranno in presenza, ma alcune categorie di studenti saranno autorizzate a sostenerlo a distanza online.

Tutti i dettagli sono nel file "Rules exam Mathematics for Insurance, Winter Session 2020/21" caricato sulla piattaforma Moodle.

SUPPORT ACTIVITIES

english

italiano

PROGRAM

english

Concept of insurance and different types of insurance. Expected utility theory framework . Life insurance, and non-life insurance. Actuarial fairness principle. Pure premium.

Life insurance: Lifetime of an individual aged x. Life statistical tables and analytical models. Endowment, pure endowment, insurance in case of death. Life annuities. Fair premium, natural premium, loaded premium. Mathematical reserve and its behaviour over time. Recursion formulas for reserves. Decomposition of a premium into savings and risk premium. Source of profit to the insurer. With profit contracts, modern insurance products, unit linked.

Non-life insurance: collective risk modeling. Typical distributions for the number of claims (binomial, Poisson, negative-binomial). Individual claim size modeling. Typical distributions for the individual claim size (exponential, Gamma, Weibull, log-normal, log-gamma, Pareto). Light-tail distributions and heavy-tail distributions. Subexponential and regularly varying at infinity distributions. Claim functions. Reinsurance. Premium loading principles.

italiano

Concetto di assicurazione. Richiami di teoria dell'utilità. Tipi di coperture assicurative. Assicurazioni vita e assicurazioni contro i danni. Principio di equivalenza attuariale. Concetto di premio puro.

Assicurazioni individuali sulla durata di vita. Tavole statistiche di sopravvivenza e modelli analitici.

Assicurazioni in caso di vita, di morte, miste. Riserva matematica. Segno ed andamento della riserva matematica. Relazioni di ricorrenza di Fouret, Kanner e Homans. Premi naturali, di rischio e di risparmio. Impiego delle relazioni di ricorrenza per il calcolo delle riserve. Origine del profitto per l'assicuratore. Polizze con partecipazione agli utili, prodotti assicurativi moderni, unit linked.

Ramo danni. Teoria collettiva del rischio. Distribuzioni tipiche per il numero di sinistri (binomiale, Poisson, binomiale negativa). Distribuzioni per ammontare del danno. Tipiche distribuzioni per l'ammontare del danno (esponenziale, Gamma, Weibull, log-normal, log-gamma, Pareto). Distribuzioni a coda leggera e a coda pesante. Distribuzioni subexponenziali, distribuzioni regularly varying at infinity. Funzioni di risarcimento. Riassicurazione. Principi di calcolo dei premi.

SUGGESTED TEXTBOOKS AND READINGS

english

Slides of the lectures, available on Moodle.

M. V. Wüthrich (2016). Non-Life Insurance: Mathematics and Statistics. Available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2319328

T. Mikosch (2009). Non-Life Insurance Mathematics, Springer.

E. Straub (1998). Non-Life Insurance Mathematics, Springer.

D. Dickson, M. Hardy, H. Waters (2009). Actuarial Mathematics for Life Contingencies Risks, Cambridge University Press.

A. Olivieri, E. Pitacco (2011). Introduction to Insurance Mathematics, Springer.

italiano

Lucidi delle lezioni, disponibili su Moodle.

M. V. Wüthrich (2016). Non-Life Insurance: Mathematics and Statistics. Disponibile al link http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2319328

T. Mikosch (2009). Non-Life Insurance Mathematics, Springer.

E. Straub (1998). Non-Life Insurance Mathematics, Springer.

D. Dickson, M. Hardy, H. Waters (2009). Actuarial Mathematics for Life Contingencies Risks, Cambridge University Press.

A. Olivieri, E. Pitacco (2011). Introduction to Insurance Mathematics, Springer

NOTE

The course delivery methods can be subject to changes according to COVID-19 outbreak current limitations.

In Academic Year 2021/22 the lectures of Mathematics for Insurance can be followed:

1) in presence

2) via webex, links below (there is one specific link for each day):

Monday link: https://unito.webex.com/unito/j.php?MTID=m1d7b6fac70f3a39a5a4ecc1cb2250ea5

Tuesday link: https://unito.webex.com/unito/j.php?MTID=m82e15d2a56d5a2ecf5765e677de591bf

Material: the material is on Moodle platform. Students who do not have access to Moodle because they do not have a UniTo account (because they did not study at UniTo before and have not enrolled yet) should contact the teacher to have the slides of the course.

Course webpage: https://www.finance-insurance.unito.it/do/corsi.pl/Show?_id=akop

MULTIVARIATE STATISTICAL ANALYSIS

MULTIVARIATE STATISTICAL ANALYSIS

Academic year:	2021/2022
Course ID:	SEM0130
Teacher:	Pierpaolo De Blasi (Lecturer)
Teacher contacts:	pierpaolo.deblasi@unito.it
Degree course:	Finance Insurance and Statistics
Year:	2nd year
Type:	Related or integrative
Credits/recognition:	6
Course SSD (disciplinary sector):	SECS-S/01 - statistica
Delivery:	Formal authority
Language:	Italian
Attendance:	Optional
Type of examination:	Oral

NOTE

english

The methods of teaching activity could change in according to the limitation imposed by the current health crisis. In any case the e-learning mode is guaranteed throughout the academic year.

italiano

Le modalità di svolgimento dell'attività didattica potranno subire variazioni in base alle limitazioni imposte dalla crisi sanitaria in corso. In ogni caso è assicurata la modalità a distanza per tutto l'anno accademico.

BORROWED FROM

Multivariate statistical analysis (MAT0041)

Laurea Magistrale (M.Sc.) in Stochastics and Data Science

Course webpage: https://www.finance-insurance.unito.it/do/corsi.pl/Show?_id=6gol

NUMERICAL AND STATISTICAL METHODS FOR FINANCE

NUMERICAL AND STATISTICAL METHODS FOR FINANCE

Academic year:	2021/2022
Course ID:	ECO0152
Teacher:	Stefano Favaro (Lecturer)
	Amir Khorrami Chokami (Lecturer)
Teacher contacts:	+39 011 6705724, stefano.favaro@unito.it
Degree course:	Finance
	Insurance and Statistics
Year:	1st year
Type:	Distinctive
Credits/recognition:	12
Course SSD (disciplinary sector):	SECS-S/01 - statistica
Delivery:	Blended
Language:	English
Attendance:	Optional
Type of examination:	Written

PREREQUISITES

It is very important for the students to be familiar with the basic topics in mathematics, probability and statistics acquired in the three-year undergraduate program. These topics are presented in the short course "Essentials of Mathematics and Probability" usually given in September: see www.masters-finins.unito.it/ for more details.

COURSE OBJECTIVES

Ability to solve, through the use of simulation tools, some standard problems in probability and statistical inference. Ability to apply statistical concepts and statistical techniques with respect to the point estimation, hyphotesis testing and confidence sets. Ability to the code with the language R and to use some of its main packages.

COURSE AIMS

Knowledge and understanding
Advances knowledge of statistical modeling via point estimation, hypothesis testing and confidence intervals; basic knowlegde of Monte Carlo simulation techniques for statistical models; basic knowlegde of the language R.

Applying knowledge and understanding
Ability to convert various problems of practical interest into statistical models and make inference on it; ability to implement a Monte Carlo simulation of a statistical model using the language R.

Making judgements
Students will be able to discern the different aspects of statistical modeling and of Monte Carlo simulation with the language R.

Communication skills
Students will properly use statistical and probabilistic language arising from the classical statistics
and Monte Carlo simulation; students will properly use the language R.

Learning skills
The skills acquired will give students the opportunity of improving and deepening their knowledge
of the different aspects of statistical modeling and Monte Carlo simulation using the language R.

COURSE DELIVERY

With regards to statistics, the course is composed of 48 hours of lectures, including lectures
dedicated to excercices. Until further notice, for the AY 2021/2022 the teaching modality is
foreseen to be in presence with synchronous online streaming -
https://unito.webex.com/meet/stefano.favaro - The classes, however, will not be recorded.

With regards to simulation, lectures are mainly devoted to the theory of Monte Carlo simulation.
The course is composed of 48 hours of lectures which (for the AY 2020/2021) will be held:

In presence according to the official timetable; Students can also participate via webex, link
on Moodle platform.
Remotely, with pre-recorded lectures.

In any case, the videos of the lectures will be available on Moodle, together with the teaching
material and updates.

Lectures are composed also by laboratories, where students can practice on R coding with the
supervision of the instructor. There also non-mandatory 30 hours of TA sessions adjoint to the
lectures.

LEARNING ASSESSMENT METHODS

With regards to statistics, the exam has the durantion of 1 hour and 15 minutes and it consists of
three parts

1) an exercise on the topics (probability) presented during the preliminary course taught by Cecilia
Scarinzi; the maximum score for the excercise is 3/33

2) a question requiring a formal discussion of one of the main topics of statistical infence based on
the likelihood function; the maximum score for this question is 18/33

3) an exercise on the topics (statistics) presented during the course; the maximum score for the
excercise is 12/33

Until further notice, for the AY 2021/2022 the exam is foreseen to be in presence.

With regards to simulation, the exam has the duration of 1 hour and it consists of one/two
exercises and theory questions. Points attributed to each question/exercise depend on the

complexity of the exercises/questions they refer to. Exercises can require drafting an R-script, complete a given code or comment an output. More specific instructions will be uploaded on Moodle and will also be sent to students registered to the exam via their institutional email addresses.

SUPPORT ACTIVITIES

No extra activities.

PROGRAM

1. Statistics: The module deals with some key themes of the theory of statistical inference, with emphasis on the role of the likelihood function. Topics include

> Random samples and their distributions, the statistical model, the likelihood function, exponential family.
> Sufficient statistics and minimal sufficient statistics, finite properties for estimators, asymptotic properties for estimators, methods for evaluating estimators.
> Methods for constructing point estimators: method of moments and generalizations, method of the least square errors, method of maximum likelihood, methods of minimum distance.
> Hypothesis testing: probabilistic structure of hypothesis testing, Neyman-Pearson lemma, likelihood ration tests, asymptotic tests, confidence sets; nonparametric tests

2. Simulation: this module introduces various computational statistical methods. In prticular, the program includes some computationally intensive methods in statistics, such as Monte Carlo methods and the bootstrap. An important part of the module will be devoted to practicals. All the methods discussed during the course will be implemented in the R software.

Topics include:

> Preliminaries:
> > Random variables/vectors and probability distributions;
> > Theorems for sequences of random variables.
> Transformations of random variables/vectors.
> Introduction to R software.
> Pseudo-random number generators.
> Generating discrete and continuous random variables:
> > The Inverse-transform method;
> > The Transformation method;
> > The Acceptance-Rejection method;
> > The Polar Method for generating Normal random variables;
> > The Composition method.
> Generating continuous random vectors:
> > The Multivariate Normal;
> > Copulas.
> Monte Carlo integration methods.
> Variance reduction techniques:
> > Antithetic Variables;
> > Control Variates;
> > Importance Sampling;
> > Sampling Importance Resampling.
> The Bootstrap Method and the Jackknife.

SUGGESTED TEXTBOOKS AND READINGS

1. Probability: ▪ Cifarelli, D.M. (1998). Introduzione al cacolo delle probabilità. McGraw-Hill; ▪ Baldi, P. (2011). Calcolo della probabilità. McGraw-Hill; ▪ Grimmett, G. and Welsh, D. (2014). Probability: an introduction. Oxford University Press.

2. Statistics: ▪ Casella, G. and Berger, R. (2001). Statistical inference. Cengage Learning Press.

3. Simulation: ▪ Ross. S.M. (2012). Simulation, 5th Edition. Academic Press. ▪ Jones, O., Maillardet, R. and Robinson A. (2014). Introduction to scientific programming and simulation usig R, 2nd Edition. Chapman and Hall/CRC.

NOTE

english
The methods of teaching activity could change in according to the limitation imposed by the current health crisis. In any case the e-learning mode is guaranteed throughout the academic year.

italiano
Le modalità di svolgimento dell'attività didattica potranno subire variazioni in base alle limitazioni imposte dalla crisi sanitaria in corso. In ogni caso è assicurata la modalità a distanza per tutto l'anno accademico.

Course webpage: https://www.finance-insurance.unito.it/do/corsi.pl/Show?_id=2cfa

QUANTITATIVE RISK MANAGEMENT

Quantitative risk management

Academic year:	2021/2022
Course ID:	SEM0088
Teacher:	Luca Regis (Lecturer) Marco Bianchetti (Lecturer) Fabio De Luca (Lecturer)
Teacher contacts:	luca.regis@unito.it
Degree course:	Finance Insurance and Statistics
Year:	2nd year
Type:	Related or integrative
Credits/recognition:	6
Course SSD (disciplinary sector):	SECS-S/06 - metodi matematici dell'economia e delle scienze att. e finanz.
Delivery:	Formal authority
Language:	English
Attendance:	Optional
Type of examination:	Written

PREREQUISITES

english

Math for Finance, Additional IT training, Numerical and statistical methods, Derivatives and Fixed-income.

COURSE OBJECTIVES

english

  The course introduces the main tools for assessing market, credit and counterparty risk in accordance to the current regulation framework. Prudent valuation principles and practice are also discussed. A special focus will be given to the necessary instruments used by Investment Bank Risk Manager during ordinary and extraordinary activities in the typically Market Risk Department to measure and understand the market risks associated to investments and trading positions. Being the course operationally oriented, attendance is strongly suggested.

COURSE AIMS

English

 At the end of the course, the student is expected to be able to:

-       understand the current regulation framework on market, credit and counterparty risk

-       calculate the market risk measures for complex portfolios, including equities, equity derivatives and bonds: this calculation will be performed automatically implementing VBA code within Microsoft Excel

-       create a pricing library to price the plain vanilla options and to calculate the principal measurements of sensitivity (Delta, Gamma, Vega, Rho, Theta)

-       automatically manage the Market Data downloading for each individual risk factor present in the portfolio, re-evaluate the portfolio under each scenario and calculate the market risk using the VaR measure

-       check the VaR model effectiveness implemented using Backtesting

-       implement some EBA StressTest scenarios to applied to the complex portfolio, of increasing importance after the recent financial crisis

-       estimate default probabilities, loss given default and exposure at default

-       compute the probability distribution of portfolio losses by the Vasicek model

-       compute the bilateral CVA/DVA of simple financial instruments

-       compute the Additional Valuation Adjustments (AVAs) of simple financial instruments

COURSE DELIVERY

english
Lectures and lab sessions.

LEARNING ASSESSMENT METHODS

english
The exam consists of homeworks and a group coursework, followed by an oral exam. Homeworks and the coursework will have three parts, which are graded as follows: 50% on part 1, 50% on part 2&3. Students taking the exam on the first session are granted a bonus of 3 extra-points.

SUPPORT ACTIVITIES

english
Compulsory homeworks will be assigned. Deadlines will be posted on Moodle.

PROGRAM

english
The course is divided into three parts:

Part 1 [24 hours]: Market risk (De Luca)

-       Introduction to VBA / Excel Programming

- Implementation of pricing functions in VBA (plain vanilla options, futures, etc.) with relative Greeks.

- Recap of Basel Accords with specific focus on Market Risk topics

- VaR calculation in historical simulation (Time series management and P&L strip calculation).

- Backtesting

- Stresstesting

- Introduction to Expected Shortfall (Fundamental Review of the Trading Book)

Part 2 [16 hours]: Credit and counterparty risk (Regis)

- Recap of Basel Accords with specific focus on Credit Risk topics

- Estimating default probabilities

- Correlation and copulas

- Credit value at risk

- Counterparty risk

Part 3 [8 hours]: Prudent valuation (Bianchetti)

- Regulatory requirements

- Theoretical background

- AVA calculations under the simplified approach

- AVA calculations under the core approach

- Practical examples

SUGGESTED TEXTBOOKS AND READINGS

english
 Material and lecture notes will be posted on Moodle.

The following are the required textbooks for the course:

Part 1

-        Benninga, S. (2008). Financial modelling (fourth edition), McGraw-Hill.

-        Hull, J. and Basu, S. (2016). Options, futures and other derivatives, Pearson.

-        Staunton, M., and Jackson, M. (2001). Advanced modelling in finance using Excel and VBA, Wiley.

Part 2

-        Roncalli, T. (in press). Risk Management & Financial Regulation.

-        Gregory, J. (2015). The xVA Challenge: Counterparty Credit Risk, Funding, Collateral, and Capital, Wiley.

Part 3

-        Bianchetti, M., and Cherubini, U. (March 1, 2016). Prudent Valuation Guidelines and Sound Practices. Available at SSRN: https://ssrn.com/abstract=2790629

Other references:

-        Brigo, D., Morini, M., Pallavicini, A. (2013). Counterparty Credit Risk, Collateral and Funding: With Pricing Cases For All Asset Classes, Wiley.

-        Brigo, D., Pallavicini, A., Torresetti, R. (2010). Credit Models and the Crisis: A Journey into CDOs, Copulas, Correlations and Dynamic Models, Wiley.

-        Resti, A., and Sironi, A. (2007). Risk Management and Shareholders' Value in Banking, Wiley.

-        Walkenbach, J. (2013). Excel 2013 Power Programming with VBA, Wiley.

NOTE

English
Students who cannot attend classes are kindly requested to contact instructors at the beginning of the course.

Course webpage: https://www.finance-insurance.unito.it/do/corsi.pl/Show?_id=ngqj

STATISTICAL MACHINE LEARNING

STATISTICAL MACHINE LEARNING

Academic year:	2021/2022
Course ID:	MAT0043
Teacher:	
Teacher contacts:	
Degree course:	Finance Insurance and Statistics
Year:	2nd year
Type:	Elective
Credits/recognition:	6
Course SSD (disciplinary sector):	SECS-S/01 - statistica
Delivery:	Formal authority
Language:	English
Attendance:	Optional
Type of examination:	Written

BORROWED FROM

Statistical machine learning (MAT0043)

Laurea Magistrale (M.Sc.) in Stochastics and Data Science

Course webpage: https://www.finance-insurance.unito.it/do/corsi.pl/Show?_id=vibk

TOPICS IN MATHEMATICAL FINANCE

TOPICS IN MATHEMATICAL FINANCE

Academic year:	2022/2023
Course ID:	SEM0145
Teacher:	Elisa Luciano
Teacher contacts:	0116705742, elisa.luciano@unito.it
Degree course:	Finance Insurance and Statistics
Year:	2nd year
Type:	Elective
Credits/recognition:	6
Course SSD (disciplinary sector):	SECS-S/06 - metodi matematici dell'economia e delle scienze att. e finanz.
Delivery:	Formal authority
Language:	English
Attendance:	Optional
Type of examination:	Written and oral

PREREQUISITES
Math for Finance

COURSE OBJECTIVES

english

Investors belong to different groups, both in terms of access to markets, or wealth, or tastes and beliefs. They trade in markets that operate with frictions and behave differently. Traditional asset pricing models with a representative agent do not do easily justice of this heterogeneity.

This course examines models and applications of financial markets with different types of heterogeneity:
  - in access to assets
  - in wealth and roles (intermediaries or institutional investors vs households)
  - in beliefs and expectations

  - in sophistication, ability, constraints, and incentives
  - in ESG preferences

These features permit to investigate the role of groups of investors, to cope with some empirical asset pricing puzzles and to understand the mixed evidence on specific, although increasingly important, assets (ESG ones, for instance).

italian

COURSE AIMS

english

italian

COURSE DELIVERY

english

italian

LEARNING ASSESSMENT METHODS

english

Assignments and problems sets on parts 1 to 4 will be distributed.

italian

PROGRAM

english

 The course will be taught by Elisa Luciano and Fabio Moneta (U. Ottawa, Telfer School of Management). The material consists of original articles. Assignments will be given and will be graded as part of the final exam.

   Review of notions & mathematical rules: own material

   Part1
   Markets with intermediaries/restricted participation, i.e. Macro, Money & Finance

   Brunnermeier, M., and Sannikov, Y., Macro, Money & Finance, wp, 2016, selected sections
   He, Z. and Krishnamurthy, A., Intermediary Asset Pricing and the Financial Crisis, Annual Reviews of Financial Economics, 2018, 10, pp. 173-97

Basak, S. and Cuoco,D., An Equilibrium Model with Restricted Stock Market Participation, The Review of Financial Studies, 1998, 11 (2), pp. 309-341.

   Part 2

Markets with heterogeneous expectations
Heterogeneity in opinions: what do we know?
Financial market models with difference of opinions
Portfolio choice

Panageas, S., The Implications of Heterogeneity and Inequality for Asset Pricing", Foundations and Trends in Finance: Vol. 12, No. 3, pp. 199–275. DOI: 10.1561/0500000057, sections 2.1.1 to 2.1.4

Part 3

Anomalies and mispricing

Limits to arbitrage

Smart money vs. dumb money

Incentives and risk-taking behavior

Short term vs. long term investors

Shleifer and Vishny, JF 1997, The limits of arbitrage

Fama and French, JF 2008, Dissecting Anomalies

Stein, Jeremy C. JF 2009, "Presidential address: Sophisticated investors and market efficiency."

Frazzini A, Pedersen LH. Betting against beta. Journal of Financial Economics. 2014 Jan 1;111(1):1-25.

Akbas F, Armstrong WJ, Sorescu S, Subrahmanyam A. Smart money, dumb money, and capital market anomalies. Journal of Financial Economics. 2015 Nov 1;118(2):355-82.

Calluzzo, Moneta, and Topaloglu, MS 2019, When anomalies are publicized broadly, do institutions trade accordingly?

Goetzmann WN, Ingersoll Jr JE, Ross SA. JF 2003 High-water marks and hedge fund management contracts.

Yan X, Zhang Z. Institutional investors and equity returns: are short-term institutions better informed?. The Review of Financial Studies. 2009 Feb 1;22(2):893-924.

Part 4
    Markets with ESG assets: theoretical framework
ESG risks and factors
Portfolio choice
Equilibrium and empirical evidence

Performance evaluation and evidence on ESG mutual funds

Pastor, L., Stambaugh, R.F., and L.A. Taylor, Sustainable Investing in Equilibrium, Journal of Financial Economics, 2021, 142 (2), pp. 550-571

Pedersen, L. H., S. Fitzgibbons, and L. Pomorski. , Responsible investing: The ESG-efficient frontier, Journal of Financial Economics , 2021, 142 (29), pp. : 572-597.

Avramov, D., Cheng, S., Lioui, A., and Tarelli, A. ,. Sustainable investing with ESG rating uncertainty., Journal of Financial Economics., 2021, available on line

Bolton P, Kacperczyk M. Do investors care about carbon risk?. Journal of Financial Economics. 2021 Nov 1;142(2):517-49.

Pastor L, Stambaugh RF, Taylor LA. Dissecting green returns. National Bureau of Economic Research; 2021 Jun 21.

SUGGESTED TEXTBOOKS AND READINGS

english
The course material consists of original articles, and eventually selected chapters from "The Economics of Continuous-time Finance" by B. Dumas and E. Luciano, MIT Press. Assignments (mainly model replications/sensitivity) will be given and will be graded as part of the final exam.

italian

Course webpage: https://www.finance-insurance.unito.it/do/corsi.pl/Show?_id=1twx

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