Course Information

Subject	**Statistics and Econometrics for Finance**
Degree	**Master in Finance**
Course	**First course**
Term	**First term**
ECTS – Credits	**2,0 ECTS**
Type of Course	**Mandatory**
Department	**ICADE Business School**
Area	**Finance**

Professor

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Attendance Hours	**Available by e-mail**
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COURSE SPECIFICS

Context of the Course

Contribution to the professional profile of the master degree.

Statistics and econometrics are tools of great importance in Finance.

At the core of multiple problems lies the description, analysis and interpretation of data. The proper use of data is intended to derive conclusions regarding empirical phenomena.

Statistics deals with methods and procedures to gather, classify, summarize, detect regularities and analyze data. Econometrics, as the science and art of building models, allows us to explore, measure and tests empirically, using real micro or macro data, the relationship between financial variables and theories about them.

Class Aims

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

1. Understand the quantitative consequences of uncertainty and risk in Finance.
2. Understand, use and develop critical thinking about the application of basic concepts in:
3. Descriptive statistics in Finance, especially the representation of different frequency distributions.
4. Probability in Finance, specially the most frequently used probability laws with continuous and discrete data
5. Statistical Inference in Finance, especially parameter estimation and hypothesis testing.
6. Econometric modelling, particularly the linear regression model.
7. Panel data analysis, fixed and random effects
8. Time series analysis, especially the Box-Jenkins (ARIMA) methodology
9. Multivariate Analysis, especially the principal component analysis
10. To get familiar with scientific articles in Applied economics and Finance
11. To use, at a basic level, some statistical packages useful for regression analysis, especially R Studio programming software.

CONTENTS

Contents
Lesson 1: Probability and Inference
• Basic probability concepts
• Probability distributions
• Basic inference concepts
• Parameter estimation: punctual and by intervals
• Hypothesis tests
Lesson 2: Regression
• Econometric basic concepts
• Linear regression model. Assumptions
• Modelling process: specification, estimation, validation and prediction
Lesson 3: Time series
• Basic concepts
• ARIMA models
• Cointegration. VAR models
• Volatility models
Lesson 4: Panel data
• Definition
• Linear models for panel data
• Fixed and random effects models
Lesson 5: Applications
• SML and CAPM
• APT
• Betas stability
• Interest rates structure
• Value-at-Risk (VaR)

Competences		
General competences		
CG01		Capacity for analysis and synthesis
	RA1	Describe, relate, and interpret situations and theoretical and practical approaches in different contexts
	RA2	Select and analyze the most significant elements and their relationships in different contexts and identify the lack of information and its relevance, establishing relationships with elements external to the situation.
	RA3	Perform analysis with the depth and coherence necessary to support business decision making with impact.
CG02		Problem solving and decision making
	RA1	Know the scope and practical utility of the theoretical notions learned. Study theoretical and practical cases and see the application to real future

		situations	
	RA2	Resolve and make decisions in case studies based on real situations autonomously between alternatives and specific situations	
CG04	Ability to manage information from different sources		
	RA1	Know, use, and discriminate the different sources of information on the subject (registered information of the markets, diffusers of information, web pages, specialized magazines, analyst reports and others) showing depth in the base of their analysis and precision in the data used	
	RA2	Identify the suitability of each source and study based on the purpose of the same, giving rigor to the opinions and conclusions taken	
CG05	Advanced computer skills related to field of study		
	RA1	Use computer tools to generate documents (graphs, tables, etc.) that illustrate and clarify arguments	
	RA2	Use audiovisual media to support oral presentations	
CG08	Critical and self-criticism capacity		
	RA1	Identify, establish, and contrast the hypotheses, variables, and results in a logical and critical way	
	RA2	Review the options and alternatives with a critical reasoning that allows you to discuss and argue contrary opinions	

Specific competences

CE14	Know and apply mechanisms to create defined functions, statistical, econometric, and mathematical analysis through computer programs	
	RA1	Know how to use statistical, mathematical, and econometric tools to analyze data and prepare research and reports.
	RA2	It is capable of programming financial utility functions and knows the use of variables, matrices, and sentences in Excel, Vb, Matlab, SPSS, Gretl for the implementation of solutions to the daily needs of a financial professional
	RA3	Use the Excel tool as an advanced user and macro generation.

RA4	Master the basic statistical, mathematical, and econometric concepts necessary for financial operations and financial research	
RA5	It is able to perform, in a basic way, derivative programming	

TEACHING AND LEARNING

General methodology characteristics of the course	
Classroom methodology: Activities	**Competences**
Most of the interaction between the professor and students takes place during the lectures. There are 3 types of activities: **Master classes** Sessions in which the professor introduces topics in a clear, structured and motivating manner. Students must attend to class with the required background for their better comprehension **Discussions** Students must attend to class with the required background and will participate actively. Several scientific papers and videos will be presented and analyzed in class. Complementary technical exercises will be required **Continuous evaluation** They are intended to check the student's progress in the assimilation of the contents given in the master classes and the discussions. These quizzes are part of the grading system and helps the students in the task of monitoring his/her evolution during the semester	
Methodology - Not in the class: Activities	**Competences**
The work that students do independently is the essential complement to the process of teaching and learning. The correct orientation, follow-up and intensity of this work is fundamental for the learning process **Study and Documentation** Preparation before the lectures according to the guidelines set by the teacher. Individual reading of various texts (books, magazines, newspapers, online publications, etc.) related to the problem being studied and the techniques and tools applied to its analysis and discussion.	

EVALUATION AND GRADING CRITERIA

Types of Evaluation	Criteria	Weight
Exam, public defence, practical cases and Final Presentation (SE1). FINAL EXAM	**To pass the subject, the final exam mark must be at least 4,90.** Right answers; Organization of information; Synthesis.	30%
Individual Test (SE2). TWO INDIVIDUAL MIDTERM EXAMS	Right answers	10%
Public, individual or group presentations (SE3) FINAL CASE PRESENTATION	Apply instructions and criteria.; Organization of information; Clarity in presentation; Means of support used; Synthesis.	15%
Individual Assignments/Practices/Works (SE4) INDIVIDUAL ASSIGNMENTS/PRACTICES/WORKS, SAME WEIGHT EACH	Apply instructions and criteria; Appropriateness in the statement of the questions; Right answers; Organization of information; Clarity in presentation; Means of support used; Synthesis.	10%
Group Assignments/Practices/Works (SE5) GROUP ASSIGNMENTS/PRACTICES/WORKS SAME WEIGHT PER EACH	Apply instructions and criteria; Appropriateness to the statement of the questions; Right answers; Organization of information; Clarity in presentation; Means of support used; Synthesis **Distribution and organization of work. Everyone must participate**	15%
Participation (SE6) PARTICIPATION, ACHIEVEMENT OF OBJECTIVES, AND COMMITMENT THROUGHOUT THE CLASSES	To achieve the pass mark, the student is required to help/push into the dynamics of the classes, provide evidence of achievement of objectives, predisposition, commitment and initiative.	20%

Notes to the evaluation criteria:

1. All students must meet a minimum of 75% attendance in the whole subject.
2. For the exercises, to be taken into account, they must be delivered through Moodle in time and format.
3. If, when combining the criteria, the final grade is equal to or higher than 5, but the minimum grade for the exams or final tests has not been achieved, the final grade will be reduced to a maximum of 4,0 points.
4. In case a student does not obtain a grade of 5,0, the student may take an extraordinary exam. In that case if the student pass the retake exam, his/her final grade in the subject must be a 5,00.
5. If the student does not comply with 70% of the evaluation activities, the weightings of the evaluation system table will not be applied, and the maximum final grade will be 4,0.

Evaluation criteria to apply at second enrolment:

Types	Criteria	Weight
Individual assignments	To pass the course, the student must deliver all the tasks assigned by the teacher	15%
Taking written exams, multiple choice tests, concept tests and solving practical cases as an exam	At least 5,00 points on the final exam, or at least an average of 5,00 on all examination activities.	70%
Participation	To achieve the pass mark, the student is required to help/push into the dynamics of the classes, provide evidence of the achievement	15%

of objectives, predisposition, commitment and initiative.	

Evaluation criteria to be applied in the case of school waiver/exemption:
In cases of exemption/dispensing from schooling, provided that the student duly justifies it, the grading criteria will be 70% for the exam (if the subject allows it, two exams will be taken, 35% each) and 30% for individual works. The individual works will serve to control the evolution of the student's learning. Only in cases in which the student is not able to answer in writing, and provide evidence that justifies it, the exam may be oral and the content of the student's answers will be transcribed.

Criteria in health alert:
The student must be permanently identified, with an identification in the classroom and with their full name remotely. Students should not change the spaces they occupy in the classroom, unless directed by a teacher or the program management.
Failure to comply with any of the health recommendations during the class sessions may imply failure in the subject.

SUMMARY OF STUDENT WORK HOURS					
ATTENDANCE HOURS					
Lectures (AF1)	Content presentation (AF2)	Homework presentation (AF3)	Exercises and assessment (AF4)	Class discussion (AF5)	Simulations (AF8)
5.00	5,00	2.00	5.00	1.00	2.00
NON-ATTENDANCE HOURS					
Study and analysis of documentation (AF9)		Performing assignment and case studies (AF10)		Tutorial sessions (AF11)	Conducting collaborative work (AF12)
15.00		8.00		2.50	5.00
ECTS CREDITS:3 ECTS					

BIBLIOGRAPHY

Recommended Bibliography
Textbooks
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DANIELSSON, J. Financial Risk Forecasting. Wiley Finance. 2011.
RACHEV, S.T. et al. Probability and Statistics for Finance. Wiley. 2010.
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Additional Readings
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Biology, Elsevier, vol. 17(C), 16-28.
CLARK, A.E., E. DIENER, Y. GEORGELLIS and R.E. LUCAS (2008), Lags And Leads in Life Satisfaction: a Test of the Baseline Hypothesis,
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COX, J.C., S.A. ROSS y M. RUBINSTEIN. Option Pricing: a Simplified Approach. Journal of Financial Economics 7 (1979), 229-263.
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LINSMEIER, T.J. y N.D. PEARSON. Risk Measurement: an Introduction to Value at Risk. University of Illinois. 1996.
MARTÍNEZ DE IBARRETA, C. et al. 101 Preguntas de Econometría (y sus respuestas). EV Services. 2014.
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