COURSE SYLLABUS

1. COURSE DESCRIPTION

Degree:	
Double Degree:	**Derecho y Finanzas y Contabilidad (English teaching)**
Course:	**STATISTICAL AND ECONOMETRIC METHODS FOR FINANCE (Métodos Estadísticos y Econométricos en Finanzas - English teaching)**
Module:	**Quantitative Methods**
Department:	**Economics, Quantitative Methods and Economic History**
Term:	**Second term**
Total credits:	**6**
Year:	**3rd**
Type of course:	**Obligatory**
Course language:	**English**

Teaching model:	**C1**
a. General background:	**50%**
b. Theory-into-practice/developmental knowledge-building:	**50%**
c. Guided academic activities:	

COURSE SYLLABUS

2. COURSE COORDINATOR

Course coordinator: Raúl Brey Sánchez

3. ACADEMIC CONTEXT

3.1. Course Description and Objectives

According to the book Econometric Analysis (1988) by Professor W.H. Greene, "Econometrics is the field of Economics that concerns itself with the application of Mathematical Statistics and the tools of Statistical Inference to the empirical measurement of relationships postulated by Economic Theory". It means that Econometrics may be defined as a set of quantitative methods of evaluation, analysis, and prediction applied to Economics and based mainly on Mathematics, Statistics, and Economic Theory. However, over the time, the area of application of the econometric tools has been gradually broadening, and now is drawing towards the fields of Finance, Marketing, Business Administration and many others that belong to the area of Business and Economics.

Advanced Statistic and econometric methods seem to be a necessary element of the education in the field of Business and Economics at the university level as it should provide students with an indispensable tool for the analysis of real-life situations that they are bound to face in their future profession. The aim of the course *Statistical and Econometric Methods for Finance* is not only to familiarize the students with the essential statistical and econometric principles, especially those, related to different techniques of Multivariate Analysis and econometric regression model; but also to teach them to use them correctly and efficiently in their daily routine while working in the field of Business and Economics. Such objectives require that the students actualize, before taking the course if it is possible, their basic knowledge of Mathematics and Statistics (both descriptive and inferential) to guarantee the comprehension and successive use of the necessary advanced quantitative methods.

Besides that, it should be underlined that to base the teaching and learning of a subject as the one in question on the use of PC is no less than fundamental today. Therefore, numerous computer practice classes are planned for this course, the aim of these classes is to achieve that the students acquire at least basic skills in operating some of the modern and most solicited, both in the market and in the field of teaching and research, specialized software, such as *IBM SPSS Statistics* and *Econometric Views (EViews)*.

3.2. Contribution to the Training Plan

Statistical and Econometric Methods for Finance is a core curriculum course that comprises 6 credits (ECTS) and is offered in the 2nd semester of the 3rd year of studies of the Official Study Plan for the Double Degree in Finance and Accounting, and Law

(GFICO-GD). The course is taught by the Academic Area of Quantitative Methods, which forms part of the Department of Economics, Quantitative Methods and Economic History.

For Finance and Accounting majors, this course is the top rung on the learning ladder leading to a comprehensive education in the fields of Statistics and Economics.

In the context of this Degree, the course is considered as providing the students with the basic knowledge of practical professional instruments. Here the previous knowledge of Mathematics, Statistics, and Economic Theory should be joined and put into practice to assure the students' capacity to design, evaluate, interpret, and foresee performance models determined by business and economic variables.

The course is designed to be primarily praxis-centred while paying proper attention to the role of theory as scaffolding. Within this broader context, special emphasis is placed on learning to use specialized software such as *IBM SPSS Statistics* and *Econometric Views (EViews)*.

3.3. Recommendations or Prerequisites

Although no formal prerequisite to enter into this course exists, to be able to follow the learning process the student should have some fundamental knowledge of Mathematics, Descriptive Statistics, Statistical Inference, and Economic Theory.

In particular, starting this course the students should possess a solid knowledge of the subjects that they have studied before within the Official Study Plan for this degree: matrix algebra and optimization (*Mathematics for Business I* and *Mathematics for Business II*), probability distribution, and Statistical Inference (*Statistics for Finance I* and *Statistics for Finance II*), and notions of Economic Theory (*Introduction to Economics*, *Microeconomics*, and *Macroeconomics*).

4. SKILLS

4.1 Degree skills developed during the Course

- Self-learning;
- Ability to adapt to new environments;
- Creativity;
- Motivation for quality;
- Team work;
- Ability for personal relations;
- Critical and logic reasoning;
- Ethical compromise in work;
- Working under pressure;
- Analysis and synthesis;
- Organization and planning;
- Oral and written communication in the English language;
- Usage of information technology;
- Searching for statistical information;
- Defining and solving specific problems about business and economic topics;
- Decision making.

4.2. Module skills developed during the Course

- Understanding of the statistic inference concepts, methods, and models. Development of the concept of the analysis of variance and of the classical econometric linear model. Acquiring the knowledge of what the nonlinear and discrete choice models are;
- Ability to apply these concepts and models to the predictive analysis;
- Ability to choose an appropriate computer programme and use it to solve the models mentioned above.

4.3. Course-specific skills

- Knowledge of the theoretical fundamentals and basic techniques of the statistical and econometric analysis;
- Acquirement of the subject-specific vocabulary;
- Development of the ability to analyze real business situations;
- Usage of appropriate techniques to compare the empirical validity of different economic and business theories, in their relation to, for example, consumption, savings, income, or consumer preferences;
- Skill to analyze new problems using the studied instruments and available statistical information, demonstrating logical and systematic reasoning, and extracting all the possible relevant information from the available data;
- Ability to establish a correlation between the subjects studied within this degree and use this knowledge in the field of mathematics, statistics, and economic theory;
- Encouragement for team work;
- Working with computer programmes as *IBM SPSS Statistics* and *EViews*;
- Identification of relevant sources of statistical and general information in the field of economics and business;
- Professional approach to analysis and usage of scientific methods in one's professional routine;
- Encouragement and development of critical thinking in general and of the critical approach to the election and use of the available resources to solve real-life problems in particular.

5. COURSE CONTENT (COURSE TOPICS)

Unit 1. – Introduction to Multivariate Techniques applied to Business and Economics.

1.1. Introduction to the methods of Multivariate Analysis: definition and classification.
1.2. Analysis of Variance (ANOVA). Single factor ANOVA. Factorial ANOVA.
1.3. Linear discriminant analysis.
1.4. Cluster analysis.

Unit 2. – The classical linear regression model: specification and estimation.

2.1. Definition of econometric model.
2.2. The econometric model of linear regression: simple and multiple analyses. Matrix formulation of the model. Classical model assumptions.
2.3. Estimation method of Ordinary Least Squares (OLS). OLS estimators' properties. Interpretation of the regression coefficients. Marginal effect.
2.4. Goodness of fit. Coefficient of determination. Adjusted coefficient of determination.
2.5. Introduction into the model of dummy variables.
2.6. Linearization of functions: the log-log model. Elasticity and marginal effect. Models comparison.
2.7. Introduction to the use of *EViews* (I).

Unit 3. – The classical linear regression model: inference and prediction.

3.1. Normality of random disturbance errors. Jarque-Bera test.
3.2. Confidence intervals.
3.3. Significance tests for individual explanatory variables, global significance tests for models, and general significance test of linear restrictions. Restricted model.
3.4. Chow test of a structural break.
3.5. Prediction.
3.6. Introduction to the use of *EViews* (II).

Unit 4. – Detecting and solving classical linear regression model problems.

4.1. Model specification errors. Detection tests.
4.2. Perfect and approximate multicollinearity: definition, detection and treatment.
4.3. Using *EViews* to deal with problems of specification in the model and multicollinearity.
4.4. Heteroskedasticity and autocorrelation. Properties of OLS estimates under non-spherical error terms. Generalized Least Squares (GLS) estimates.
4.5. Detection and treatment of heteroskedasticity with *EViews*.

4.6. Detection and treatment of autocorrelation with *EViews*.

Unit 5. – Discrete dependent variable models.

5.1. Introduction to binary choice models.
5.2. Linear probability model.
5.3. Logit and probit models.
5.4. Estimation of binary choice models using *EViews*.

6. METHODOLOGY AND RESOURCES

Students are expected to attend lectures and practical sessions of the course, although teacher-student communication via the virtual platform WebCT is going to play an important role in the learning process, too.

Classroom-based teaching hours will be divided between General/Background Sessions (50%) and Practical/Developmental knowledge-building Sessions (50%) organized in the following manner:

- General/Background Sessions (EB):

  During the semester, there will one session of 1.5 hours a week. These classes will consist in general lectures; their objective is to introduce students into the basic theoretical principles of the subject.

- Practical/Developmental knowledge-building Sessions (EPD):

  As well, one weekly Practical/Developmental knowledge-building Session of 1.5 hours will be given during the semester. The object of these sessions is to offer a more detailed view to the theoretical material learned in the EB classes, use this knowledge to solve problems on the blackboard, as well as with the help of the specialized software *IBM SPSS Statistics* and *EViews*. To assure that the students are able to handle this software, some basic user guides for the programmes will be distributed among them in advance.

  Apart from these learning modules, there is a possibility for students to address any question or doubt related to the subject to the professor during individual tutorials.

7. ASSESSMENT

All the activities realized by the student during the course will be taken in account for evaluation; the weight of each activity in the final mark will depend on its importance within the course, on the difficulty that it presents, and on the effort and dedication that it requires from the student.

Precisely, the evaluation process of the knowledge and competences acquired during the course will include the following tasks:

- Final examination:

  The final exam will be organized in the end of the semester and will bear 50% of the final mark for the course, that is, 5 points out of 10. Within those 5 points the theoretical knowledge may have the value of 1.5 points, the evaluation material for this part will be presented in the form of a test. As to the practical skills, those will have a joint value of 3.5 points; to pass this part students will be required to solve various problems.

- Continuous assessment:

  The students' learning progress follow-up will be assured by various control materials offered throughout the semester. The continuous assessment will make up 50% of the final mark of the course, that is, 5 points of 10. Various types of control have been designed to assess the skills acquired in different types of classes within this learning module:

  - The assimilation of the theoretical material will be checked by short tests in the end of each unit. The total value of this kind of control will be of 1.5 points.
  - As to the evaluation corresponding to the practical part of the course, the students will be periodically asked to do on their own and out of the classroom timetable some exercises related to different themes of the curriculum and hand them in to the lecturer. The total value of these exercises will be of 0.5 points.
  - As part of the learning process, the students will work with the programmes *IBM SPSS Statistics* (Unit 1) and *EViews* (Units 2, 3, 4, and 5). The evaluation of the corresponding skills will be carried out throughout the course by means of diverse practical exercises on the computer offered during certain sessions of which the students will be informed in advance. The total value of 1.5 points corresponds to this type of work with *EViews*.
  - Lastly, the students will be asked to realize an assignment in groups from to 3 to 5 members, in which they will demonstrate the theoretical

knowledge acquired, as well as the practical skills and skills of handling the electronic tools of *IBM SPSS Statistics* and/or *EViews.* At the same time, they will show the level of group work competences which they will have achieved. This task will be given in advance, so as to allow sufficient time for students to realize it, and further task details will be published in the course area of WebCT. The total value of this work will be of 1.5 points, with 0.5 points of those corresponding to the evaluation of above mentioned computer programmes handling skills.

To pass this course, the following minimum scores are required:

- Final examination: 1.75 points of 5.
- Computer programme handling skills: 1 point of 2.
- Final examination + Continuous assessment: 5 points out of 10.

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In the case that a student fails to accumulate throughout the semester the minimal points required for the works which correspond to handling of computer programmes, they will have a possibility to improve this part of the continuous assessment tasks on the very day of the final exam realizing a specific additional task.

If the student complies with the minimum required, the final mark for the course will be calculated as a sum of those received for the written exam and as the result of continuous assessment. For the course to be passed, this sum shall amount to at least 5 points.

Second call

Those who have not passed the course within the first call will be able to present themselves for the second call in June/July. The final exam will be retaken.

Students will be allowed to **give up** the points obtained throughout the course corresponding to the continuous assessment items (5 points), but then they will have to take an additional exam on the day of the exam. This exam will contain multiple choice questions, exercises, and activities intended to evaluate the computer programme handling skills. In order to take this additional exam, students will have to send an email at rbresan@upo.es 10 days before the exam date.

Those students who fail to reach the minimum passing score in the computer practices (1 point out of 2) will be required to take that exam again.

Minimum scores:

- Final examination: 1.75 points of 5.
- Computer programme handling skills: 1 point of 2.

- Final examination + Continuous assessment: 5 points out of 10.

Comments

Only the objects and supporting material expressly authorized by the course lecturers will be permitted for use during the realization of the control tasks.

The students shall carry their national ID or other official ID to any control session organized throughout the course.

8. BIBLIOGRAPHY

BASIC:

- Gujarati, D.N. (2003): Basic Econometrics. 4th ed. McGraw-Hill.
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COMPLEMENTARY:

- Asteriou, D. and Hall, S.G. (2007): A Modern Approach Using EViews and Microsoft. New York, Palgrave MacMillan.
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