



Universidad
Rey Juan Carlos

Universidad Rey Juan Carlos
Facultad de CC. Jurídicas y Sociales
(Campus de Vicálvaro)

CURSO 2009-2010

Degree: Licenciatura en Investigación y Técnicas de Mercado

Department:: Department of Financial Economy and Accountancy II

Subject: **Multivariate Statistical Analysis**

Type: Compulsory

Course: 2º

Term: Second

Credits: 6

Professor: Clément Kanyinda-Malu Kabiena

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Location: Despacho 75 Edificio Departamental

Total hours: 180

Theoretical hours: 20

Practical hours: 40

Student personal hours and other activities: 120

Objectives, skills and abilities:

Generic abilities and skills	After completing the course, the student can ordinarily be able to:
	1. Identify and understand the structure of multivariate data and be able to phrase the appropriate scientific questions in terms of parameters of interest
	2. Understand the various assumptions needed for different methodologies covered in the class as well as their implementation.
	3. Read the scientific literature and comprehend the use (and misuse) of multivariate analysis methodologies reported by study authors
Specific abilities and skills	The student will be able to handle very large datasets and manage data tables
	The student will be able to implement analyses of multivariate methods in a statistical software package
	The student will be able to apply suitable methodology to find out solutions to Economic and Business problems described through big datasets.
	The student will be able to find and apply convenient statistical techniques depending on type of data

Prerequisites:

Upon entering this course, student is expected to have completed 4.5 credits of elementary statistics, with knowledge of descriptive statistics, probability and inference statistics. It is assumed that student is able to use Excel. The use of statistical computer software package SPSS will be discussed during the course.

Content:

Lectures	Sections
Lecture 1. "Bases of multivariate analysis"	1.1.- Concept of Multivariate analysis 1.2.- Brief history. 1.3.- Types of data 1.4.- Multivariate analysis methods.

Lecture 2. "Principal Components Analysis"	2.1.- Types of data. 2.2.- General problem in PCA. 2.3.- Obtaining principal components. 2.4.- Interpretation of PCs.
Tema 3. "Factor Analysis"	3.1.- Introduction 3.2.- Factor Analysis model. 3.3.- Factors extraction methods. 3.4.- Contrasts in factor analysis. 3.5.- Factors rotation. 3.6.- Results interpretation.
Lecture 4. "Discriminant Analysis"	4.1.- Introduction. 4.2.- General approach to Discriminant Analysis. 4.3.- Descriptive Discriminant methods. Implementation. 4.4.- Results interpretation. 4.5.- Decision based discriminant analysis. 4.6.- Step-by-step discriminant analysis.
Lecture 5. "Simple correspondence analysis"	5.1.- Introduction. 5.2.- Approach and solution of simple correspondence analysis problems. 5.3.- Results Interpretation. 5.4.- Approach and solution of multiple correspondence analysis problems. 5.5.- Results interpretation
Lecture 6. "Classification techniques"	6.1.- Role and significance of classifications. 6.2.- Medidas de proximidad. 6.3.- Formal aspects. 6.4.- Non hierarchical classification. Partition methods. 6.5.- Hierarchical classification. 6.6.- Interpreting classifications

Methodology:

- Combine classroom-tested pedagogy with SPSS statistical software Package
- Work through learning-by-doing examples and practical applications
- Students will be asked to prepare and present an oral talk of their final project (practical homeworks).

Lecture Schedule: (lectures per week)

First week: Theoretical master class+practical, Review of matrix algebra and Lecture 1.
Second week: Theoretical master class, Lecture 2.
Third week: Practices, Lecture 2.
Fourth week: Theoretical master class, Lecture 3.
Fifth week: Practices, Lecture 3
Sixth week: Master class, lecture 4.
Seventh week: Practices, lecture 4.
Highth week: Master class, lecture 5.
Ninth week: Practices, lecture 5.
Tenth week: Master class, lecture 6.
Eleventh week: Practices, lecture 6.
Twelfth week: Practices: lectures 2 through 6.
Thirteenth week: Works and practices presentation.
Fourteenth week: Works and practices presentation.

Grading and Examinations:

Grading for this course combines theoretical and practical questions related to the interpretation of different analysis methods covering material that is emphasized in class. Practical questions refer to the understanding and explaining the SPSS outputs with its adequate interpretation. Participation and attendance during practical class will be recognized and evaluated.

Exams: 50%

Class attendance: 10%

Participation: 20%

Practices: 20%

Language: English

Reading TextBooks:

Even if the lectures will be given in English, students will be asked to read some Complementary textbooks in Spanish.

English Textbooks

- Hardle Wolfgang, and Z. Hlavke (2007): *Applied Multivariate statistical Analysis*, Springer
- Hardle Wolfgang, and Z. Hlavke (2007): *Multivariate statistics exercises and solutions*, Springer

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Basic bibliography:

- Uriel, E., Aldás, J. (2005). *Análisis Multivariante Aplicado*. Thomson.

Complementary Bibliography:

- Lévy Mangin, J.P., Varela Mallou (coordinadores) (2003). *Análisis Multivariante para las Ciencias Sociales*. Prentice Hall.
- Luque, T. (2000). *Técnicas en Análisis de Datos en Investigación de Mercados*. Pirámide
- Pérez, C. (2004). *Técnicas de Análisis Multivariante de Datos. Aplicaciones con SPSS*. Prentice Hall.
- Vicente y Oliva, M. de; Manera Bassa, J.; Blanco Jiménez, F. J. (2000). *Análisis Multivariante para las Ciencias Sociales*. Dykinson.