

Academic Year: (2019 / 2020)

Review date: 25-04-2019

Department assigned to the subject: Department of Statistics

Coordinating teacher: DELGADO GOMEZ, DAVID

Type: Electives ECTS Credits : 6.0

Year : 2 Semester : 1

COMPETENCES AND SKILLS THAT WILL BE ACQUIRED AND LEARNING RESULTS.**COMPETENCES**

1. Capacity for identifying problems associated with statistical data in several variables.
2. Basic knowledge for handling vectors and matrices.
3. Acquire skills in multivariate data description.
4. Capacity for making and interpreting plots of multivariate datasets.
5. Know the properties of multivariate distributions.
6. Capacity for making hypothesis testing on a multivariate population.
7. Acquire skills in principal component analysis and factorial analysis.
8. Acquire skills in heterogeneity problems such as outlier detection, hypothesis testing for different means, classification and clustering.
9. Handle statistical software for multivariate analysis.

SKILLS

1. Aptitude to understand a real problem and to analyze it as an statistical problem.
2. Modeling and solving problems.
3. Capacity of analysis and synthesis.
4. Oral and written skills.
5. Aptitude to work in a group.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Multivariate data.
 - 1.1 Introduction.
 - 1.2 Multivariate data.
 - 1.3 Visualization of multivariate data.
 - 1.4 Multivariate descriptive methods.
 - 1.5 Linear transformations.
2. Inference for the multivariate Gaussian distribution.
 - 2.1 Introduction.
 - 2.2 Basic concepts.
 - 2.3 Multivariate distributions.
 - 2.4 Estimation.
 - 2.5 Hypothesis testing.
3. Principal component analysis.
 - 3.1 Introduction.
 - 3.2 Principal components.
 - 3.3 Normalized principal components.
 - 3.4 Principal components in practice.
4. Factor analysis.
 - 4.1 Introduction.
 - 4.2 Factor analysis.
 - 4.3 Inference.
5. Canonical correlation analysis.
 - 5.1 Introduction.
 - 5.2 Canonical correlations.
 - 5.3 Canonical correlations in practice.
6. Discriminant analysis.
 - 6.1 Introduction.
 - 6.2 Bayes rule classifiers.
 - 6.3 Nearest neighbors.

- 6.4 Logistic discrimination.
- 6.5 Alternative methods.
- 7. Cluster analysis.
 - 7.1 Introduction.
 - 7.2 Proximity measures.
 - 7.3 Hierarchical methods.
 - 7.4 Partition methods.
 - 7.5 Model-based clustering.

LEARNING ACTIVITIES AND METHODOLOGY

Theoretical classes with support material taken from the web.
 Problem solving classes. Computing classes in computer halls. Oral presentations.
 Individual tutorials.

ASSESSMENT SYSTEM

Final exam: 50%
 Three Projects: 50%
 In order to pass the subject a 5 out of 10 must have been obtained in the final exam.

% end-of-term-examination:	50
% of continuous assessment (assignments, laboratory, practicals...):	50

BASIC BIBLIOGRAPHY

- Alan Julian Izenman Modern multivariate statistical techniques, Springer, 2008
- Richard A. Johnson and Dean W. Wichern Applied Multivariate Statistical Analysis, Pearson Education, 2007

ADDITIONAL BIBLIOGRAPHY

- Dillon, W., Goldstein, M. (1984). Multivariate Analysis., New York, Wiley..
- Krzanowski, W.J. (1988). Principles of Multivariate Analysis: A. User's Perspective., Oxford University Press, Oxford..
- Mardia, K.V., Kent, J.T. y Bibby, J.M. (1979). Multivariate Analysis., New York, Academic Press..
- Seber, G.A.F. (1984). Multivariate Observations., New York, Wiley..