Probability II

Academic Year: (2022 / 2023) **Review date: 31-05-2022**

Department assigned to the subject: Statistics Department

Coordinating teacher: JIMENEZ RECAREDO, RAUL JOSE

Type: Basic Core ECTS Credits : 6.0

Year : 1 Semester : 2

Branch of knowledge: Social Sciences and Law

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Probability I

OBJECTIVES

1. Understand the concept of random vector: description and applications.
2. Use the concept of correlation.
3. Work with the multivariate normal distribution.
4. Use the limit theorems and asymptotic results in statistical applications.
5. Understand the concept of statistics and its sampling distribution.
6. Obtain the sampling distribution of estimators in normal population and derive the associated confidence intervals.
7. Use computational tools for calculation of confidence intervals.

1. Information Management Skills.
2. Solve Problems independently.
3. To be capable of using creative thoughts when it comes to solve problems.
4. Critical Reasoning.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Discrete random vectors.
1.1. Joint, marginal and conditional distributions.
1.2. Independence.
1.3. Functions of random vector.
1.4. Expected value, variance, Conditional expectation.
1.5. Discrete multivariate models.
1.6. Markov inequality. Convergence in probability.
1.7. Laws of Large Numbers
1.8. Moments. generating functions. Convergence in distribution
1.9. Moivre¿Laplace theorem

2. Continuous random vectors.
2.1. Joint, marginal and conditional distributions.
2.2. Independence.
23. Function of random vector.
2.4 Expected value, variance and conditional expectation.
2.6. Markov inequality. Convergence in probability.
2.7. Laws of Large Numbers
2.8. Moments, generating functions. Convergence in distribution
2.9. Central Limit Theorem

3. Distributions related to Normal distribution.
3.1. Change of variable.
3.2. Two-dimensional and multidimensional normal distribution.
3.3. Chi-square and t-student.
3.4. Fisher's theorem

LEARNING ACTIVITIES AND METHODOLOGY

Theory (4 ECTS). Lectures with available material posted in internet. Problems (2 ECTS) Problem Solving classes. Work assignments in groups.

ASSESSMENT SYSTEM

Continuous evaluation (midterms, exercises and resolution of homework) 100%.
Students who have not taken the continuous assessment or who have failed it may take a final exam worth 60% of the subject.

% end-of-term-examination:	0
% of continuous assessment (assigments, laboratory, practicals…):	100

BASIC BIBLIOGRAPHY

- Casella, G. y Berger, R.L. Statistical Inference, Wadsworth and brooks. 1990.

ADDITIONAL BIBLIOGRAPHY

- Durret, R. The Essentials of Probability, Duxbury Press. 1994.

- Grimmett, G. y D. J. A. Welsh. Probability: An introduction., Oxford University Press, 2003