

Academic Year: ( 2022 / 2023 )

Review date: 17-05-2022

Department assigned to the subject: Statistics Department

Coordinating teacher: AUSIN OLIVERA, MARIA CONCEPCION

Type: Basic Core ECTS Credits : 6.0

Year : 1 Semester : 1

Branch of knowledge: Social Sciences and Law

## REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

The curriculum provides no prerequisite for courses. However, it is recommended that the student knows the basic properties of real numbers, inequalities and drive that familiar with elementary functions, derivatives and integrals to high school level.

## OBJECTIVES

Cognitive skills (knowledge): Properties of the probability measure. Conditional probability. Independence of events. Basic tools of counting. Elementary calculus of probabilities. Discrete random variables. Probability mass functions. Continuous random variables. Probability distribution functions. Probability density functions. Calculus and interpretation of expected values and variances of random variables. Higher order moments. Moment generating function. Binomial model, hypergeometric, negative binomial, Poisson, uniform, exponential, normal and gamma. Stochastic modeling.

Transversal competences: Capacity development and model building and validation. Identification of relevant information to solve a problem. Visualization and interpretation solutions. Identification and location of logical errors. Logical argumentation in decision-making. Application of knowledge into practice.

## DESCRIPTION OF CONTENTS: PROGRAMME

Course consists of three thematic blocks:

1. Basic concepts of probability spaces.
  - 1.1. Properties of probability measures.
  - 1.2. Conditional probability and total probability formula, Bayes multiplication.
  - 1.3. Applications.
  - 1.4. Independence of events.
  - 1.5. Combinatorial notions.
  - 1.6. Elementary calculus of probabilities.
2. One-dimensional discrete random variables.
  - 2.1. Probability mass function, expected value and variance of discrete random variables.
  - 2.2. Discrete probability distributions commonly used.
  - 2.3. Stochastic modeling.
3. One-dimensional continuous random variables.
  - 3.1. Probability density function, expected value and variance of continuous random variables.
  - 3.2. Moment generating function.
  - 3.2 Continuous models commonly used in statistical inference.
  - 3.4 Distribution of transformations of random variables.

## LEARNING ACTIVITIES AND METHODOLOGY

Theory (4 ECTS). Theory classes with additional material available on the Web. Practical classes (2 ECTS) Problem solving classes. Problem based learning classes.

## ASSESSMENT SYSTEM

Final exam (60%). Midterm exam (40%).

<b>% end-of-term-examination:</b>	60
<b>% of continuous assessment (assignments, laboratory, practicals...):</b>	40

## BASIC BIBLIOGRAPHY

- Durrett R. Essentials of Probability. , Duxbury Press, Belmont CA, 1993
- Grimmett, G. y D. J. A. Welsh. Probability: An introduction., Oxford University Press, 2003