Simulation and Resampling methods

Academic Year: (2023 / 2024)   **Review date: 26-04-2023**

Department assigned to the subject: Statistics Department

Coordinating teacher: AUSIN OLIVERA, MARIA CONCEPCION

Type: Electives ECTS Credits : 6.0

Year : 4 Semester :

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Probability and data analysis
Statistical learning
Predictive modeling

DESCRIPTION OF CONTENTS: PROGRAMME

1. Random number generation
2. Monte Carlo methods
a. Rejection method
b. Importance sampling
3. Markov Chain Monte Carlo Methods
a. Metropolis Hastings algorithm
b. Gibbs sampling
c. Slice sampling
4. Resampling methods
a. Bootstrap
b. Jacknife
c. Randomization tests
d. Cross-validation

LEARNING ACTIVITIES AND METHODOLOGY

AF1: THEORETICAL-PRACTICAL LESSONS where the knowledge that students should acquire is presented. Students will receive class notes and basic reference texts to facilitate the follow-up of the classes and the development of the subsequent work. Exercises, practical problems will be solved by students and workshops and evaluation tests will be held to acquire the necessary skills.

AF3: INDIVIDUAL OR GROUP WORK OF THE STUDENT.

AF9: FINAL EXAM where the knowledge, skills and abilities acquired throughout the course will be assessed globally.

MD1: CLASS THEORY. Presentations offered by the teacher in class with computer support and audiovisual media, where the main concepts of the subject are developed and materials and bibliography are provided to complement the students' learning.

MD2: PRACTICES. Resolution of practical case studies, problems, etc. proposed by the teacher individually or in groups.

MD3: TUTORIALS. Individualized assistance (individual tutorials) or group (collective tutorials) offered to students by the teacher.

ASSESSMENT SYSTEM

FINAL EXAMINATION. Knowledge, skills and abilities acquired throughout the course will be assessed globally.

CONTINUOUS EVALUATION. Work in class, presentations, debates, presentations, exercises, practices and workshops throughout the course will be evaluated.

% end-of-term-examination: 60

% of continuous assessment (assigments, laboratory, practicals…):   40

BASIC BIBLIOGRAPHY
  - Suess, Eric A., Trumbo, Bruce E. Introduction to Probability Simulation and Gibbs Sampling with R, Springer, 2011