Bayesian Data Analysis

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

Department assigned to the subject: Statistics Department

Coordinating teacher: AUSIN OLIVERA, MARIA CONCEPCION

Type: Compulsory ECTS Credits : 6.0

Year : 3 Semester : 2

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Probability and Data Analysis
Introduction to Statistical Modeling
Statistical Learning

DESCRIPTION OF CONTENTS: PROGRAMME

0. Review of Probability and random variables
1. Frequentist vs. Bayesian approaches
2. Conjugate distributions
3. Gaussian models
4. Sampling-Based Approaches to Bayesian Estimation
5. Regression and Linear Models
6. Generalized linear models
7. Bayesian clustering
8. Non linear regression

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

- 15% Midterm exam
- 15% Presentation of exercises (videos and presentations in class)
- 10% Project based on a real data set
- 60% Final exam

A minimum grade of four points out of ten is required in the final exam.

% end-of-term-examination: 60

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

BASIC BIBLIOGRAPHY

- Albert, J. Bayesian Computation with R, Springer. , 2007

- Kruschke, J.K., Doing Bayesian Data Analysis: A Tutorial with R and BUGS, Academic Press., 2015

- Robert, C.P., Casella, G Introducing Monte Carlo Methods with R, Springer , 2010