27019 - Mathematical Statistics

Academic Year	2018/19
Subject	27019 - Mathematical Statistics
Faculty / School	100 - Facultad de Ciencias
Degree	453 - Degree in Mathematics
ECTS	7.5
Year	3
Semester	Second semester
Subject Type	Compulsory
Module	---

1.General information

1.1.Aims of the course

1.2.Context and importance of this course in the degree

1.3.Recommendations to take this course

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as lectures, computer problem-solving sessions, laboratory sessions, tutorials and autonomous work and study.

4.2.Learning tasks

This course is organized as follows:

- **Lectures**.

- **Problem-solving sessions**.
- **Computer laboratory sessions**.
- **Tutorials**.
- **Group activities**.
- **Autonomous work and study**.

4.3.Syllabus

This course will address the following topics:

- **Topic 1**. Statistical data analysis. Revision of the one and two variable cases.
- **Topic 2**. Basic concepts on Statistical Inference. Population and random samples. Statistics. Sampling from the Normal distribution. Order statistics. Convergence concepts and limit theorems.
- **Topic 3**. Point estimation. Desirable properties of an estimator. Methods of finding and evaluating estimators. Large sample properties for máximum likelihood estimators. Interval estimation.
- **Topic 4**. Hypothesis testing. The Neyman-Pearson approach. The duality of confidence intervals and hypothesis tests. Likelihood ratio tests. Tests for Normality, goodness of fit and independence. Comparing two samples.

4.4.Course planning and calendar

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course will be provided on the first day of class or please refer to the Faculty of Sciences website and Moodle.

4.5.Bibliography and recommended resources

- Casella, George. Statistical inference / George Casella, Roger L. Berger . - [2nd. ed.] Pacific Grove, California : Wadsworth and Brooks/Cole Advanced Books and Software, cop. 2002
- Cristóbal Cristóbal, José Antonio. Lecciones de Inferencia estadística / José Antonio Cristóbal Cristóbal . - 1a ed. Zaragoza : Prensas Universitarias de Zaragoza, 2003
- Dudewicz, Edward J. Modern mathematical statistics / Edward J.Dudewicz, Satya N.Mishra New York : John Wiley & Sons, cop.1988
- Rohatgi, Vijay K. An introduction to probability theory and mathematical statistics / V.K. Rohatgi and E. Saleh. New York [etc.] : John Wiley & Sons, cop. 2011
- Garthwaite, Paul H.. Statistical inference / Paul Garthwaite, Ian Jolliffe and Byron Jones . Oxford : Oxford University Press, 2009
- Bickel, Peter J.; Doksum, Kjell A.. Mathematical statistics: basic ideas and selected topics. vol. 1. 2nd. ed. Pearson Prentice Hall. 2006
- Vélez Ibarrola, Ricardo. Principios de inferencia estadística / Ricardo Vélez Ibarrola, Alfonso García Pérez Madrid : UNED, 2002
- Rice, John A. Mathematical Statistics and Data Analysis/ J. A. Rice. Brooks/Cole 3rd edition 2007.