

## 26813 - Statistical Methods for Optics and Optometry

### Syllabus Information

**Academic Year:** 2019/20

**Subject:** 26813 - Statistical Methods for Optics and Optometry

**Faculty / School:** 100 - Facultad de Ciencias

**Degree:** 297 - Degree in Optics and Optometry

**ECTS:** 6.0

**Year:** 2

**Semester:** Second semester

**Subject Type:** Basic Education

**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

Professors will provide sufficient material of interest in order that the student can find real (or close to real) applications of statistics.

Ongoing work will be motivated.

Lecture sessions with the whole group in which the main concepts will be presented, together with some problems in which these concepts will be applied.

Into the previous lecture sessions the main difficulties arising to the students in the resolution of the problems and questions proposed will be discussed, trying to detect the main errors in the resolutions, as well as which questions have been solved satisfactorily.

Practical classes with few students, developed in computer labs, to analyze data coming from real problems, as well as simulation studies, in order that the student can understand the basic properties explained (without proof) in the lecture sessions.

Tutorial sessions to discuss issues concerning difficulties in the learning process, to correct ways of working, to monitorize the practical work assigned to the student, etc...

## 4.2.Learning tasks

Two hours per week of lectures with the whole group. The students will be provided previously with lecture notes with the main concepts and simple illustrative examples.

Two hours per week of practical sessions in computer lab. The students will be provided previously with scripts for these sessions as well as with the simulation experiments to be developed in class.

Problem solving sessions. Previous lists of problems will be delivered to the student.

Individual coaching, personal study and work, work in groups, etc...,

## 4.3.Syllabus

The thematic parts of the subject are the following:

Part 1. (5 weeks) Introduction to Statistics. Types of studies, of data, of posible variables. Descriptive numerical and graphical analysis of a statistical variable. Bivariate analysis: Independence-association, correlation, regression.

Part 2. (4 weeks) . Games of chance. Probability and basic rules. Conditional probability and independence. Probabilistic model. Random variables and vectors. Characterization of their probability distribution. Law of large numbers and Central Limit Theorem. Discrete and continuous models more relevant.

Part 3. (6 weeks) Population and sample. Random sample. Statistical model for a data set. Point and interval estimation of parameters. Hypothesis testing. Comparisons of two groups: t tests and Rank tests. Inference with categorical data. Computation of sampling size

## 4.4.Course planning and calendar

**The Schedule of lectures and practical sessions will be previously announced in the web page of the faculty, as well as the web page of the course.**

A mid-term exam will be done. The exam date will be previously announced through the web page of the course.

## 4.5.Bibliography and recommended resources

- BB** Devore, Jay L.. Probabilidad y estadística para ingeniería y ciencias / Jay L. Devore . 6ª ed. México [etc.] : Internatio Editores, cop. 2005
- BB** Horra Navarro, Julian de la. Estadística aplicada / Julián de la Horra Navarro . - 3ª ed. Madrid : Diaz de Santos, 200:
- BB** Libro blanco de la visión en España [2009] / Visión y Vida, FEDAO Madrid : Visión y Vida, 2009
- BB** Moore, David S.. Estadística aplicada básica / David S. Moore . - 2ª ed. Barcelona : Antoni Bosch, D.L. 2005
- BB** Peña Sánchez de Rivera, Daniel. Fundamentos de estadística / Daniel Peña . - 1ª ed., 1ª reimp. Madrid : Alianza, 20