

## 26701 - Biostatistics

### Syllabus Information

**Academic year:** 2023/24

**Subject:** 26701 - Biostatistics

**Faculty / School:** 104 - Facultad de Medicina

229 - Facultad de Ciencias de la Salud y del Deporte

**Degree:** 304 - Degree in Medicine

305 - Degree in Medicine

**ECTS:** 6.0

**Year:** 1

**Semester:** Second semester

**Subject type:** Basic Education

**Module:**

### 1. General information

Its inclusion as a basic subject responds to the students' need to acquire sufficient knowledge and handling of this tool, both for their healthcare and research work.

Applying appropriate statistical techniques to the data generated by their patients will help achieve various Sustainable Development Goals (SDGs). . It allows to optimize the knowledge about these patients and to evaluate the interventions carried out (Goal 3: Health and Wellness). Improves reading comprehension of scientific articles of interest and the use of scientific evidence as a tool in decision making (Goal 10: Reduction of Inequalities).

Inclusive language will be used (Goal 5: Gender Equality), and all available digital media, eliminating the use of paper (Goal 13: Climate Action)

### 2. Learning results

**Upon completion of this subject, the student will be able to:**

Perform and interpret the results of a statistical analysis and draw conclusions according to the proposed objectives.

Know the different types of data and measurement scales. Manage the symbols and notations typical of the statistical language to correctly express situations specific to the field of Medicine.

Construct and interpret frequency distributions by means of tables, graphs and data synthesis. Both for one-dimensional and two-dimensional analysis.

Understand the concepts of probability. The total probability theorem, the concept of independence and the theorem of Bayes. Know the evaluation of diagnostic tests.

Know the concept of random variable and the main types of discrete and continuous distributions. As well as their convergences.

Make estimates of population parameters by means of confidence intervals and interpret them appropriately.

Calculate the sample size needed to perform statistical estimation.

Perform hypothesis tests on parametric and nonparametric theoretical models and correctly express the plausibility of the decision made in a particular contrast.

Calculate the sample size needed to perform statistical hypothesis testing.

Decide whether there is some kind of relationship between two given quantitative variables and construct the dependence model or association best suited to this possible relationship. (Correlation and regression).

Be able to analyse whether there is a relationship between qualitative or "categorical" variables and measure their degree of association. ( Chi-square and measures of association).

Know and use different computer packages and be able to perform statistical analysis with them.

Understand and interpret statistical data in the medical literature

### 3. Syllabus

**Theoretical classes**

**Block I. Theoretical bases of Biostatistics (5 topics).**

DESCRIPTIVE STATISTICS. One- and two-dimensional variables.

PROBABILITY. Basic concepts. Discrete and continuous random variables.

**Block II: Parametric, nonparametric inference and measures of association (6 topics).**

ESTIMATION and sample size

HYPOTHESIS TESTING. Fundamentals. Parametric and non-parametric contrasts. Sample size MEASURES OF ASSOCIATION. Correlation and Regression and Contingency Tables.

### **Practical Classes (12 sessions).**

Each theoretical topic is complemented by one/two practical sessions.

### **Computer Laboratory (3 sessions)**

Descriptive statistics. Probability. Inference. Measures of association.

IBM SPSS and EPIDAT statistical packages or free software (FCCSD) are used.

## **4. Academic activities**

### **Master class.**

It will motivate the need to introduce new concepts when their applicability is needed, reflecting that they arise as response to problems posed by previous models. Examples and their resolution by means of statistical programs will be interspersed.

### **Practical classes**

This activity, as important as the previous one, allows a more active participation of the students, helps them to fix theoretical knowledge, and brings them closer to solving real problems.

### **Computer Science Practices:**

After learning to identify the models presented in theory and to test their understanding, operation and interpretation in practice, they will be approached with the help of a statistical package.

**Personalized tutoring.** At established hours. Appointment.

### **ADD/WebCT.**

## **5. Assessment system**

**In all exams** each part (theory and problems) is graded out of 10. For averaging, a minimum of 4 points is required in each part and an average of 5 to eliminate topics for the next exams..

**Midterm** It will eliminate topics ONLY for the Final Examination 1st call. It consists of:

-theory: test questions and/or short subject.

-practice: typical problems and/or with computer outputs.

The topics of the first part of the subject are included.

Grade: average of theory and practice grades

### **Final Exam 1st call:**

**If students have eliminated topics through the midterm exam and do not wish to improve their grade.** It deals with the topics of the second part of the subject. It consists of: -theory: test questions and/or short topic.

-practice: typical problems and/or with computer outputs.

Final grade: 90% by exam (grade first midterm x 0.40 plus grade second midterm x 0.50) plus 10% for participation in class.

**If students have NOT eliminated topics in the midterm or wish to improve their grade.** It deals with the topics of the whole subject. It consists of:

-theory: test questions and/or short subject.

-practice: typical problems and/or with computer outputs.

Final grade: average of theory and practice grades

### **Final Exam 2nd call**

Same conditions as in Final exam 1st call **If they have NOT eliminated topics through the midterm exam or wish to improve their grade.**