Course: Statistics II  
Code: 10BBA40001

Type: Required  Year: 2  Semester: 1  
ECTS credits: 4  
Language: Spanish  
Coordination:

Faculty:  
Vicenta Sierra Olivera  
Joan Sureda Pascual

Prerequisites:  
Statistics I

Prior knowledge:  
Statistics I

Workload distribution:  
Lectures 26 hours  
Participatory sessions 19.5 hours  
Independent work 70.5 hours  
Tutorials / feedback 4 hours

Course contribution to the programme:  
Statistics is a fundamental tool to be able to make decisions in settings in which the quantity of data and/or the level of doubt does not permit extracting the information directly. In this class, we shall explore some of the theoretical and practical principles which constitute the basis for predictions, estimates and testing hypotheses, all of which are used to transform the information we have.

Course learning objectives:  
Upon completing this course, students should be able to:

- Apply statistical reasoning in practical situations.  
- Make decisions in situations full of doubt.  
- Relate this course with others and students’ future professional endeavours.  
- Make inferences about unknown population parameters.  
- Select the appropriate statistical technique to make estimates or predictions.  
- Test hypotheses on population parameters or distributions.
And, stemming from these global objectives, the following series of specific skill development objectives will be addressed throughout the course:

A. Present reference frameworks, theories and tools as well as the keys for their use to analyse diverse situations.
B. Use theoretical concepts and models in concrete situations.
C. Become familiar with the diverse statistical tools.
D. Apply that learnt to real situations.
E. Structure and consolidate knowledge.
F. Evaluate learning and become aware of what factors have to be taken into consideration due to multiple reasons (difficulty, strong point, etc.).

**Skills developed:**
- Be capable of acquiring, understanding and critically structuring knowledge.
- Be capable of applying knowledge to achieve results.
- Have the ability to constantly learn.
- Make decisions/judgements in complex situations.

**Contents and methodology:**
**BLOCK 1: SAMPLE DISTRIBUTIONS**
1.1. Distribution of sample average
1.2. Distribution of sample variance
1.3. Distribution of sample proportion

**BLOCK 2: ESTIMATION**
2.1. Point estimation
2.2. Interval estimation

**BLOCK 3: HYPOTHESIS TESTING BASICS**
3.1. Hypothesis testing concepts: P-value and the statistical power of tests
3.2. Test for averages, variance and proportions (one sample)
3.2. Test for averages, variance and proportions (two samples)

**BLOCK 4: NON-PARAMETRIC TESTS**
4.1. Goodness-of-fit test
4.2. Pearson’s chi-square test for independence and homogeneity
BLOCK 5: INTRODUCTION TO STATISTICAL MODELLING

5.1. Statistical modelling stages
5.2. Application: one-factor ANOVA model
5.3. Application: simple linear regression model

ACTIVITIES:

Block 1: 4 hours of lectures and 3 hours of participatory classes
Block 2: 6 hours of lectures and 4.5 hours of participatory classes
Block 3: 7 hours of lectures and 6 hours of participatory classes
Block 4: 3 hours of lectures and 3 hours of participatory classes
Block 5: 6 hours of lectures and 3 hours of participatory classes

Class lectures: The faculty will combine theoretical explanations with exercises and case studies. At the end of each session, there will be a test to check knowledge acquisition among students via their individual work.

Participatory classes: In these sessions students will carry out different types of activities:
1. Plan and resolve problems in pairs chosen beforehand.
2. Practice on the statistical software used in class.

Tutorials:
1. Required: 2 or 3 times during the course; students will have 30 minutes to present the work prepared in participatory classes. In these sessions, the tutor will evaluate the work carried out, students’ participation and attendance as well as the skills developed.
2. Voluntary: for any students requiring them.

Evaluation:
Skill evaluations include weekly tests and presentations of the work carried out in participatory classes.

In all cases, evaluation is seen as a formative instrument in addition to one which totals different test results. As such, the faculty will focus on student progress evaluations as a process which has to be continuously measured.

Details are provided below on the formative activities, instruments and evaluation criteria for each objective/competency to be evaluated, in addition to their respective weight (%) for the final grade.

A. The reference frameworks, theories and tools as well as the keys for their use to analyse diverse situations are presented in class lectures. They will be evaluated by means of tests during these same sessions (ongoing evaluation) and in the final exam.
B. The correct use of theoretical concepts and models in concrete situations is achieved by means of exercises which are carried out individually and/or in pairs. These will be evaluated in participatory classes based on the presentation of the work done, through tests and the final exam.

C, D and E. These will be evaluated in participatory classes based on the presentation of the work done, through tests and the final exam.

F. To evaluate students’ learning, students will receive feedback from the faculty throughout the course depending on the evaluation instrument and timing.

Should students score a 4 or above (out of 10) on the final exam, the final grade for the course will be computed as follows:
- 20%: weekly tests
- 15%: work carried out and participation
- 65%: final exam

If students receive less than a 4 on the final exam or if the final course grade is lower than a 5, students will have to sit an extraordinary exam representing 100% of the final course mark.

The acquisition of skills foreseen for this course will be evaluated by means of weekly tests in lecture classes and the presentation of work carried out in participatory sessions during the obligatory tutorials as scheduled.

The evaluation of students’ efforts in this class, graded 0 to 10, will bear in mind the acquisition of the learning objectives. The information regarding the development of skills worked on throughout the course may be included in this 0 to 10 mark; in addition, it will be scored by an independent indicator, ranging from A to D. This mark will be given in the students’ different classes and will serve to keep track of each student’s progress throughout the programme.

**Core bibliography:**

**Complementary bibliography and reading material:**