UAB
Universitat Autònoma de Barcelona

2023/2024

Tool I: Statistical Data Processing

Code: 106748
ECTS Credits: 6

Degree	Type	Year	Semester
2504604 Environmental Sciences	FB	2	1

Contact

Name: Josep Maria Burgues Badia

Email: josepmaria.burgues@uab.cat

Teaching groups languages

You can check it through this link. To consult the language you will need to enter the CODE of the subject. Please note that this information is provisional until 30 November 2023.

Prerequisites

It is advisable to have passed the course of Mathematics in the first year.

Objectives and Contextualisation

The objective of this course is to introduce the basic statistical tools to analyze data arising from experiments or observations, focusing on their correct use and the interpretation of the results. The practices with computer of this subject, that are realized with a statistical software package in the computer classroom, are an indispensable part of the course in order to achieve these goals.

Learning Outcomes

- CM02 (Competence) Transmit the basic mathematical information related to an environmental problem to the general public correctly.
- KM01 (Knowledge) Identify the basic relationships between the principles and foundations of Mathematics and environmental processes.
- SM01 (Skill) Set out the resolution of basic mathematical problems associated with the environment.
- SM04 (Skill) Express yourself correctly using basic mathematical language.

Content

1. Descriptive Statistics. Variability and errors. Precision and accuracy. Descriptive analysis of data from a single variable. Descriptive analysis of data from two variables: the regression line.

2. Probability. Basic properties of probability. Combinatorics. Conditional probability. Independence of events. Bayes Formula. Discrete random variables. Expected value and variance. Continuous random variables. Normal distribution. Approximation of the Binomial by Poisson or Normal distributions. Independence of random variables.

3. Statistics. Introduction to Statistics: population, sample, parameters and estimators. Sampling distributions. Confidence intervals. Introduction to hypothesis tests. Tests for the expected value and for the variance. Tests for the proportion. Tests of comparison of expected values and of variances for two normal populations. Tests of comparisons of two proportions. Khi-Square independence test. Normality tests and non-parametric tests. Analisys of variance and introducction to the design of experiments.

0.- Introductión to satistical packages. (In sessions of practice)

Methodology

The course consists of:

1. Theory classes where the basic concepts of the subject are introduced and the main techniques of statistics are explained, showing examples of their application.
2. Problem solving classes where the concepts and statistical tools introduced in the theory classes are put into practice by means of the analysis of concrete examples.
3. Practices with computer where the student will learn to use specific statistical software.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Practices with statistical software	10	0.4	CM02, KM01, SM01, SM04, CM02
Problem solving classes	10	0.4	CM02, KM01, SM01, SM04, CM02
Theory classes	30	1.2	CM02, KM01, SM01, SM04, CM02
Type: Supervised			
Tutoring	10	0.4	CM02, KM01, SM01, SM04, CM02
Type: Autonomous			
Autonomous study	81	3.24	KM01, SM01, KM01

Assessment

The mark of the subject by continuous assessment, AC, will be obtained from:

1. the marks of two partial exams, E1 and E2,
2. the mark of the practices with computer, P.

according to the formula: $AC = 0.35\,E1 + 0.40\,E2 + 0.25\,P$.

In order to pass the subject without having to retake, a minimum score of 3.5 must have been obtained in E1 and E2.

Under the last condition, the student passes the course if AC is greater than or equal to 5. Otherwise, the student has a recovery exam whose mark, ER, will replace the mark of the two partial examinations, E1 + E2, however the mark P of the practices is NOT recoverable. In order to be able to attend the recovery exam, the student must have previously been evaluated of continuous assessment activities that are equivalent to 2/3 of the total. By no means the qualification of the recovery exam will be larger than 6,5.

It is considered that the student presents himself for the evaluation of the course if he has participated in evaluation activities that exceed 50% of the total amount. Otherwise the student will be considered as calificación será de Not Evaluable.

UNIQUE EVALUATION:

Students choosing this system must apply BEFORE THE FIRST EXAM OF THE CONTINUOUS EVALUATION. This system implies the resignement of the right fOR THE continuous evaluation.

Practices with software of statistics and the correspondant EVALUATION are mandatory.

The student who chooses this mode of assessment will, on the date of the second term, take an exam of the entire subject.

If the student does not pass the subject, he/she can opt for the retrieval exam under the same terms as the rest of the students.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Exam E1	35%	3	0.12	CM02, KM01, SM01, SM04
Exam E2	40%	3	0.12	CM02, KM01, SM01, SM04
Practice P	25%	3	0.12	CM02, KM01, SM01, SM04

Bibliography

1. Delgado, R. Probabilidad y Estadística para ciencias e ingenierías, Editorial Delta, 2008.
2. Bardina, X., Farré, M. Estadística descriptiva, Manuals UAB, 2009.
3. Devore, Jay L. Probabilidad y Estadística para ingeniería y ciencias, International Thomson Editores, 1998.
4. Milton. J. S. Estadística para Biología y Ciencias de la Salud, Interamericana de España, McGraw-Hill, 1994.
5. Moore, D. S. Estadística aplicada básica, Antoni Bosch editor, 2000.

Software

We will use the software RCommander, or an equivalent one.