28711 - Statistics

Syllabus Information

Academic Year: 2019/20
Subject: 28711 - Statistics
Faculty / School: 175 -

Degree: 423 - Bachelor's Degree in Civil Engineering

ECTS: 6.0
Year: 2
Semester: Second semester
Subject Type: Basic Education
Module:

1.General information

1.1.Aims of the course

This course is an introduction to practical data treatment. It covers compiling, presentation and data analysis through the use of software tools. Moreover, the student acquires the ability of prepare and present reports on the gathered information. The study of uncertainty introduces the student to real-life modelling and proccess simulation. Finally, basic statistical inference concepts such as confidence intervals and hypothesis test serve as a basis for more advanced, engineering-inspired statistical techniques. The ultimate goal is that students integrate basic knowledge of the course in all kinds of topics related with their future professional life.

1.2.Context and importance of this course in the degree

This course is compulsory and belongs to the basic education module. It is taken during the second semester of the second year of the Bachelor's Degree in Civil Engineering It is assumed that the student has acquired the learning goals in Mathematics I and Mathematics II courses.

Moreover, Statistics provides skills in tools relevant to different subsequent courses with contents such as economy, quality, etc. Different economic parameters, quality improvement, system refinement and new system simulation are activities specific to engineers.

Because of these reasons, Statistics is a basic tool in a Civil Engineer's education.

1.3.Recommendations to take this course

The recommended profile to take the Statistics course is to possess working knowledge of differential and integral calculus. In addition, it is highly advisable that the student be familiar with symbolic and numeric software tools.

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 learning process designed for this subject is based on the following:

Strong interaction between the teacher/student. This interaction is brought into being through a division of work and responsibilities between the students and the teacher. Nevertheless, it must be taken into account that, to a certain degree, students can set their learning pace based on their own needs and availability, following the guidelines set by the teacher.

The current subject, Statistics, is conceived as a stand-alone combination of contents, yet organized into three fundamental and complementary forms, which are: the theoretical concepts of each teaching unit, the solving of problems or resolution of questions, at the same time supported by other activities.

The organization of teaching will be carried out using the following steps:

Theory Classes:
Theoretical activities carried out mainly through exposition by the teacher, where the theoretical supports of the subject are displayed, highlighting the fundamental, structuring them in topics and or sections, interrelating them.

Practical Classes:
The teacher resolves practical problems or cases for demonstrative purposes. This type of teaching complements the theory shown in the lectures with practical aspects.

Individual Tutorials:
Those carried out giving individual, personalized attention with a teacher from the department. Said tutorials may be in person or online.

4.2.Learning tasks

The programme offered to the student to help them achieve their target results is made up of the following activities...

Involves the active participation of the student, in a way that the results achieved in the learning process are developed, not taking away from those already set out, the activities are the following:

- Face-to-face generic activities:
  - Theory Classes: The theoretical concepts of the subject are explained and illustrative examples are developed as support to the theory when necessary.
  - Practical Classes: Problems and practical cases are carried out, complementary to the theoretical concepts studied.
- Generic non-class activities:
  - Study and understanding of the theory taught in the lectures.
  - Understanding and assimilation of the problems and practical cases solved in the practical classes.
  - Preparation of seminars, solutions to proposed problems, etc.
  - Preparation of the written tests for continuous assessment and final exams.

The subject has 6 ECTS credits, which represents 150 hours of student work in the subject during the trimester, in other words, 10 hours per week for 15 weeks of class.

4.3.Syllabus

Statistics program:

1. Introduction to the Statistics Programming Language `R`
2. Descriptive Statistics
3. Probability Theory
4. Random Variables
5. Useful Distributions
6. Multidimensional Random Variables
7. Reliability Theory
8. Linear Programming
9. Point Estimates and Confidence Intervals
10. Hypothesis test
11. Multivariate Linear Regression

4.4.Course planning and calendar

The dates of the final exams will be those that are officially published at
https://eupla.unizar.es/asuntos-academicos/examenes.

Week	Theme	Topic	Tests	Weight	Content
1	1	R Introduction			
2	2	Descriptive Statistics	1st test	5	Descriptive St.
3	3	Probability	2nd test	5	Probability
4	4	Random Variables			
5	5	Distributions			
6			3rd control	5	Distributions
7	6	Multidimensional RV			
8	7	Reliability Theory	1st exam	35	Probability
9	8	Linear Programming	4th test	5	Linear Programming
10	9	Statistical Inference			
11		Confidence Intervals	5th test	5	Estimation
12	10	Hypothesis Tests			
13					
14			6th test	5	Hyp. Tests
15	11	Linear Regression	2nd exam	35	Inference

4.5.Bibliography and recommended resources

http://biblos.unizar.es/br/br_citas.php?codigo=28711&year=2019