Universitat de Lleida

DEGREE CURRICULUM
STATISTICS AND COMPUTER SCIENCE

Coordination: ESCOLÀ AGUSTÍ, ALEXANDRE

Academic year 2021-22

Subject's general information

Subject name	STATISTICS AND COMPUTER SCIENCE
Code	102523
Semester	1st Q(SEMESTER) CONTINUED EVALUATION

Typology	Degree	Course	Character	Modality
	Bachelor's Degree in Agricultural and Food Engineering	2	COMMON	Attendance-based

Course number of credits (ECTS)	6

Type of activity, credits, and groups	Activity type	PRALAB	PRAULA	TEORIA
	Number of credits	2.4	0.8	2.8
	Number of groups	2	2	1

Coordination	ESCOLÀ AGUSTÍ, ALEXANDRE
Department	AGRICULTURAL AND FOREST ENGINEERING
Teaching load distribution between lectures and independent student work	Each credit or ECTS is equivalent to 25 hours of student work, 10 of which are face-to-face (i.e., student-teacher activities) and the remaining 15 hours are self-employed.
Important information on data processing	Consult this link for more information.
Language	Catalan and Castilian
Distribution of credits	The subject is divided into 2 blocks: Block 1 - Computer Science and Block 2 - Statistics. In Block 1 there will be 1.6 theoretical ECTS and 2.4 ECTS of practice in computer room. In Block 2 there will be 1.6 theoretical ECTS and 0.4 ECTS of practical exercises in the classroom.

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
COLOMER CUGAT, MA. ANGELES	mariangels.colomer@udl.cat	2,8	
ESCOLÀ AGUSTÍ, ALEXANDRE	alex.escola@udl.cat	2,4	
LLORENS CALVERAS, JORDI	jordi.llorens@udl.cat	2,4	
MIRANDA , JUAN CARLOS	juancarlos.miranda@udl.cat	1,6	

Subject's extra information

Subject / subject in the curriculum

The subject, Statistics and Computer Science belongs to Module I, of basic training, of the title of Degree in Agricultural and Alimentary Engineering and covers two differentiated fields of knowledge: (1) the technologies of the information applied to the field of Agricultural Engineering and Food (ICT) and (2) that of statistics. The course is taught in the second year in order to provide students with basic and applied knowledge that will become tools to support both the development of other subjects of the Degree and future professional development.

Computer skills are the set of knowledge, skills, and abilities that enable students to know the basics and operation of Information and Communication Technologies (ICT), their professional applications and how they can be used to achieve specific goals. To achieve these skills, two complementary pathways are used: (1) the subject of "Statistics and Computer Science" where 4 ECTS are dedicated to this area of knowledge and (2) the deepening and extension of these contents in other subjects of the curriculum.

Learning objectives

The student, upon passing the subject, must be able to:

Block 1 .- Computer science:

- Understand and demonstrate knowledge about the technological bases of ICT and their application and use in the field of agricultural engineering.
- Understand and demonstrate basic knowledge of computer equipment and methods applied to agricultural engineering.
- Create complex text documents.
- Create complex spreadsheets.

Block 2 .- Statistics:

- Understand and know the statistical tools necessary to solve basic problems in the agricultural field.

- Know how to design and plan data collection in real problems

Competences

Basic skills:

CB1. That students have demonstrated that they possess and understand knowledge in an area of study that starts from the base of general secondary education, and is usually found at a level that, although supported by advanced textbooks, also includes some aspects that imply knowledge from the forefront of your field of study.

CB2. That students know how to apply their knowledge to their work or vocation in a professional way and possess the competencies that are usually demonstrated through the elaboration and defense of arguments and the resolution of problems within their area of study.

CB3. That students have the ability to gather and interpret relevant data (usually within their area of study) to make judgments that include reflection on relevant issues of a social, scientific or ethical nature

CB4. That students can transmit information, ideas, problems and solutions to both specialized and non-specialized audiences

General competences:

CG7. Knowledge of basic, scientific and technological subjects that allow continuous learning, as well as an ability to adapt to new situations or changing environments.

CG8. Ability to solve problems with creativity, initiative, methodology and critical reasoning.

CG12. Ability to work in multidisciplinary and multicultural teams.

CG13. Correction in oral and written expression

CG15. Mastery of Information and Communication Technologies

CG16. Respect for the fundamental rights of equality between men and women, the promotion of Human Rights and the values of a culture of peace and democratic values

Specific skills:

CEFB1. Ability to solve mathematical problems that may arise in engineering. Ability to apply knowledge about: linear algebra; geometry; differential geometry; differential and integral calculus; differential equations and partial derivatives; numerical methods, numerical algorithmic; statistics and optimization.

CEFB3. Basic knowledge about the use and programming of computers, operating systems, databases and computer programs with applications in engineering.

Subject contents

BLOCK 1: COMPUTER SCIENCE

THEORETICAL CONTENTS

Unit 1. Introduction to information and communication technologies (ICT) and computer science

Computers and computer systems. Use of ICT in agricultural engineering.

Unit 2. Technological bases of ICT (I) and computing

Digital technology. Logic circuits. Computers and computer systems. Data and coding systems.

Unit 3. Technological bases of ICT (II) and computing

Equipment and components of computer systems.

PRACTICAL CONTENTS

- **Practice 1. Advanced text editing (5 sessions)**
- **Practice 2. Advanced spreadsheet editing (5 sessions)**
- **Practice 3. Bases of structured programming (2 sessions)**

BLOCK 2: STATISTICS

THEORETICAL CONTENTS

Unit 1. Sampling distributions. (2 hours)

Introduction. Sampling distributions .. Distribution of the sample mean. Distribution of sample proportions,. Distribution of the sample variance,. Sampling distribution of the ratio of variances. Sampling distribution of the difference in means and the difference in proportions.

Unit 2. Estimation by intervals (2 hours).

Introduction. Confidence intervals for the population mean. Confidence intervals for sample proportions. Confidence intervals for variances. Confidence intervals for variance relations. Confidence intervals for difference of means and difference of proportions.

Unit 3. Hypothesis tests. Proposal of a hypothesis test. (4 hours)

Introduction. Statistical hypotheses. Hypothesis testing. Types of errors and power of a test. Significance level and critical level. Type I error and type II error.

Unit 4. Goodness of fit and independence tests. (2 hours)

Introduction. Chi-square test. Kolmogorov-Smirnov test. Independence test.

Unit 5. Analysis of variance (4 hours).

Fixed factor experiments. Experiments with more than one factor. Verification of the model. Analysis of the difference of means.

PRACTICAL CONTENTS

- **Practice 1. Resolution of a practical case of hypothesis tests and confidence intervals. (2 hours).**
- **Practice 2. Resolution of a practical case of analysis of variance of more than one factor. (2 hours).**

Methodology

The theoretical contents will be carried out by means of the format of participatory master class, in big group.

The practical sessions, either in the classroom or in the computer room, will be carried out in two medium groups in order to facilitate participation and interaction with the teacher.

Development plan

The subject planning will follow the official timetables issued by the Direcció d'Estudis. They are available at the

website of the degree GEAA.

Evaluation

The evaluation of the subject will be organized in blocks. Block 1, Computer Science, will represent 66% of the final grade and Block 2, Statistics, will represent 34% of the final grade. The default evaluation is the continuous evaluation. If a student is unable to follow the continuous assessment for any justifiable reason, he / she must inform the coordinator of the subject within a period not exceeding 1 month from the beginning of the classes and the case will be studied and given. there solution.

In order to be able to pass the subject, it is necessary to obtain at least a mark corresponding to 40% of the maximum score of each block. In case of not obtaining this mark after the corresponding recoveries, the final mark of the subject will not be able to be surpassed to 4 points out of 10 and, therefore, will not be able to pass the subject.

BLOCK 1 - Computer science has a weight of 66% and will be evaluated through the following activities:

- Exam that will include the theoretical contents of the subject and some practical contents. The exam will have a weight of 30% on the final mark of the subject. In order to pass the course you must have a grade of at least 4 points out of 10 in the exam. The exam and its corresponding recovery will be carried out on the days assigned to the official calendar of the degree by the director of studies.
- A work in pairs that will be used to evaluate the practical sessions of advanced text editing. This work will have a weight of 20% on the final note of the asignatura. In order to pass the course you must have a grade of at least 3 points out of 10 of the work. The grade of the work will not be recoverable.
- Individual and / or group practical exercises and activities corresponding to the practical sessions of advanced edition of spreadsheets and structured programming. This section will have a weight of 16% on the final mark of the subject. The internship grade will not be recoverable.

Attendance at the different practical sessions of Block 1 is not mandatory. However, attendance control of the practical sessions will be carried out and the teacher reserves the right to summon students who have not attended certain sessions so that they can explain orally, with the corresponding computer support, how they have resolved the practices he has not attended. In these cases, the note of the practices that the student has not attended will be provisional (as long as he has presented it within the term established for all the students) until it is not validated after the oral session. Once the oral session has taken place, the grade can be confirmed or lowered according to the teacher's criteria.

BLOCK 2- Statistics has a weight of 34% and will be evaluated through a 2-hour exam and a course work.

To pass the subject it is necessary to obtain a grade equal to or greater than 5 in all assessment activities. In the case of not taking any test will be qualified as NP (Not Presented). In all other cases, the evaluation of the subject will not have been approved.

Assessment activities not passed in the exam type may be resumed in the scheduled week of retakes.

In order to be able to make a fair assessment of all students, plagiarism will be meticulously pursued in the activities provided. Any plagiarized activity will count 0 points on the assessment.

Bibliography

BASIC BIBLIOGRAPHY

Block 1 - Computer science

- MINGUET, J. M. i READ, T. Informática fundamental. Ed. Universitaria Ramón Areces.
- SERRA, M. i BAÑERES, D. (coordinadors). Fonaments de computadors. UOC.

- Manuals de MSWord, MSExcel i de RStudio diversos.

Block 2 - Statistics

- CANAVOS, C. George. Probabilidad y Estadística. Aplicaciones y métodos. Mc Graw Hill, 1992.
- COLOMER C, MªÀ. Curs d'estadística. Problemes. Edicions de la Universitat de Lleida i F.V. libros, 1999.

Supplementary bibliography

- PRIETO ESPINOSA, A. LLORIS, ANTONIO. Introducción a la Informática. McGraw-Hill, 2006
- ARANDA, M. C. i altres. Fundamentos de informática. Universidad de Málaga.
- GARCÍA PÉREZ, A. Estadística Aplicada: conceptos básicos. Universdad Nacional de Educación a distancia, 1992.
- MONTGOMERY. D.C., i RUNGER, G. Probabilidad y Estadística. Aplicadas a la Ingeniería. Mc Graw Hill,1996