Universitat de Lleida

DEGREE CURRICULUM
STATISTICS AND COMPUTER SCIENCE

Coordination: ESCOLA AGUSTI, ALEXANDRE

Academic year 2022-23

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/CORE	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	ESCOLA AGUSTI, 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	
ESCOLA AGUSTI, ALEXANDRE	alex.escola@udl.cat	2,4	
MIRANDA , JUAN CARLOS	juancarlos.miranda@udl.cat	1,6	
PUIGDOMENECH FRANQUESA, LUIS	lluis.puigdomenech@udl.cat	2,4	

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. Introduction to statistical inference

Unit 2. Confidence intervals

Unit 3. Hypothesis testing

Unit 4. Introduction to computer models. An application with Population Dynamic P System models.

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

Block 1. Computers

The theoretical contents will be taught in the format of participatory master class, in big group.

The practice sessions, either in the classroom or in the computer room, will be taught spliting the group in two medium groups in order to facilitate participation and interaction with the teacher.

Block 2. Statistics

Theoretical and practical classes. The theoretical contents will be explained and exercises will be solved using the classic tools, in order to be able to control and interpret the results that the statistical packages give us.

The R program will be taught with which students will have to solve a series of cases.

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, represents 66 % of the final grade and Block 2, Statistics, represents 34 % of the final grade. The default evaluation is the continuous evaluation.

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. If this grade is not obtained after the corresponding retakes, the final grade of the subject may not exceed 4 points out of 10 and, therefore, the subject may not be passed.

BLOCK 1 - Computer Science has a weight of 66 % in the final grade and is evaluated through the following activities:

- Theoretical-practical 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 study director, which can be consulted on the GEAA website.
- 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.
- Exercises and practical 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 the following activities:

- Exam with a weight of 50 % of the mark of Block 2.
- 4 activities (one per topic) that will be done during the course with a weight of 50 % of the grade of Block 2.

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 appearing in any test will be qualified as NP (Not Presented). In all other cases, the evaluation of the subject will not have been passed.

The exam can only be retaken if it has not been passed and the retake will take place in the planned week of retakes, according to the official calendar of the degree.

General remarks

- If a student is unable to follow the continuous assessment for any justifiable reason, he / she must inform the ETSEA Head of Studies and request the alternative assessment procedure **within the established period**.
- 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