Universitat de Lleida

DEGREE CURRICULUM

STATISTICS AND INFORMATICS

Coordination: COTS RUBIO, LLUIS

Academic year 2023-24

STATISTICS AND INFORMATICS 2023-24

Subject's general information

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<tr><td>Code</td><td>102426</td></tr>
<tr><td>Semester</td><td>2nd Q(SEMESTER) CONTINUED EVALUATION</td></tr>
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<tr><th>Degree</th><th>Course</th><th>Character</th><th>Modality</th></tr>
<tr><td>Bachelor's Degree in Forest Engineering</td><td>2</td><td>COMMON/CORE</td><td>Attendance-based</td></tr>
<tr><td>Double degree: Bachelor's degree in Forest Engineering and Bachelor's degree in Nature Conservation</td><td>2</td><td>COMMON/CORE</td><td>Attendance-based</td></tr>
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<tr><th>Activity type</th><td>PRALAB</td><td>PRAULA</td><td>TEORIA</td></tr>
<tr><th>Number of credits</th><td>3</td><td>0.6</td><td>2.4</td></tr>
<tr><th>Number of groups</th><td>2</td><td>2</td><td>1</td></tr>
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<tr><td>Coordination</td><td>COTS RUBIO, LLUIS</td></tr>
<tr><td>Department</td><td>AGRICULTURAL AND FOREST SCIENCES AND ENGINEERING</td></tr>
<tr><td>Teaching load distribution between lectures and independent student work</td><td>Each ECTS credit is assigned 25 hours of student work. 10 hours per ECTS are devoted for in-person student work attending the different academic activities and 15 hours per ECTS are devoted to independent student work.</td></tr>
<tr><td>Important information on data processing</td><td>Consult this link for more information.</td></tr>
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STATISTICS AND INFORMATICS 2023-24

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
COLOMER CUGAT, MA. ANGELES	mariangels.colomer@udl.cat	2,6	
COTS RUBIO, LLUIS	lluis.cots@udl.cat	2,4	
LLORENS CALVERAS, JORDI	jordi.llorens@udl.cat	1,8	
SEGARRA BOFARULL, JOAN	joan.segarra@udl.cat	2,8	

Subject's extra information

Subject / subject in the whole curriculum

The Statistical and Computing Subject belongs to the Basic Training Module I of the Degree in Forestry Engineering and provides two distinct areas of knowledge: (1) Information and Communication Technology (ICT) applied to the field of Information Technology 'Forestry Engineering, and (2) statistics. The subject is taught in the second year in order to provide students with basic and applied knowledge that can be converted into support tools for the development of other subjects of the Degree as well as for future professional development.

The computer skills are the set of knowledge, abilities, dispositions and behaviors that enable the students to know what are the Information and Communication Technologies (ICT), for what they are and how they can be used in Forestry Engineering to achieve specific objectives of the subject.

Two complementary ways are used to achieve these competencies:

1. Integration of part of these contents in the subjects of the syllabus.

2. The subject of "Statistics and Computer Science", where 4 ECTS are dedicated to this purpose.

Requirements to take it

Prerequisites:

Have studied or be enrolled in the subject "Mathematics II".

Learning objectives

Block 1.- Statistics:

1. Understand and know the statistical tools necessary to solve basic problems in the forestry field.

2. Knowing how to design and plan data collection in real problems.

Block 2.- Computing :

3. Understand and demonstrate knowledge of the technological bases of ICT applicable to forestry engineering.

4. Understand and demonstrate basic knowledge of computer equipment and methods applicable to forestry engineering.

5. Know how to prepare complex text documents.

6. Know how to make complex spreadsheets.

7. Know how to program with R code for data processing.

The learning outcomes are as follows:

LO1 : Demonstrate theoretical and applied knowledge of descriptive statistics, analysis of variance and regression.

LO2 : Know how to use the main usual computer tools for statistical calculation.

LO3 : Demonstrate a set of theoretical and applied knowledge about the technological bases of computer equipment currently used and their applications in the forestry field. Demonstrate ability to make a justified choice of the elements that make up an IT team.

LO4 : Demonstrate theoretical and practical knowledge of the computer methods and equipment needed to prepare text documents and complex spreadsheets.

Competences

Basic and general competences

CB1 . That students demonstrate 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 it is supported in advanced textbooks, also includes some aspects that they involve knowledge from the cutting edge of their field of study.

CB2. That students know how to apply their knowledge to their work or vocation in a professional way and that they possess the skills that used to be demonstrated through the preparation and defence of arguments and the resolution of problems within their area of study.

CB4. That students can transmit information, ideas, problems and solutions to a large audience specialized and non-specialized.

CB5. That students develop the learning skills necessary to undertake further studies with a high degree of autonomy.

CG1. Ability to understand the biological, chemical, physical, mathematical foundations and representation systems necessary for the development of the professional activity, as well as to identify the different biotic and physical elements of the forest environment and the renewable natural resources susceptible of protection, conservation and uses in the forestry sector.

CG7. Ability to solve technical problems arising from the management of natural spaces.

CG17. Mastery of Information and Communication Technologies.

Specific competences

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 algorithm; statistics and optimization.

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

Subject contents

Theoretical content

BLOCK 1.- STATISTICS:

Topic 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.

Topic 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 ratios. Confidence intervals for difference in means and difference in proportions.

Topic 3. Tests of hypotheses. Setting up a hypothesis test. (4 hours)

Introduction Statistical assumptions. Contrasts of hypotheses. Types of errors and power of a test. Significance level and critical level. Type I error and Type II error.

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

Introduction Chi- square test. Kolmogorov-Smirnov contrast. Test of independence.

Topic 5. Analysis of variance (4 hours)

Experiments of a fixed factor. Experiments with more than one factor. Model verification. Analysis of the difference in means.

BLOCK 2.- COMPUTING:

Topic 1. Introduction to information and communication technologies (ICT)

Computers and computer systems. Use of ICT in Agroforestry Engineering.

Topic 2. Technological bases of ICT (I)

Digital logic and logic circuits.

Topic 3. Technological bases of ICT (II)

Components of computer systems.

Topic 4. Basics of structured programming

Basic programming structures.

Practical activities

BLOCK 1.- STATISTICS:

Practice 1. Solving a practical case of hypothesis testing and confidence intervals (3 hours).

Practice 2. Solving a practical case of analysis of variance of more than one factor (3 hours).

BLOCK 2.- COMPUTER SCIENCES (PRACTICES):

Practice 1.1. Digital logic and logic circuits

Practice 1.2. Digital logic and logic circuits

Practice 2.1. Word processing: MSWord Microsoft 365 Apps Advanced I

Practice 2.2. Word processing: MSWord Microsoft 365 Apps advanced II

Practice 2.3. Word processing: MSWord Microsoft 365 Apps advanced III

Practice 2.4. Word processing: MSWord Microsoft 365 Apps advanced IV

Practice 2.5. Word processing: MSWord Microsoft 365 Apps Advanced V

Practice 2.6. Search (Web of Knowledge, Sciencedirect and Scopus) and management of scientific information with Mendeley, Zotero.

Practice 3.1. Spreadsheets: MSExcel Microsoft 365 Apps Advanced I

Practice 3.2. Spreadsheets: MSExcel Microsoft 365 Apps Advanced II

Practice 3.3. Spreadsheets: MSExcel Microsoft 365 Apps Advanced III

Practice 3.4. Spreadsheets: MSExcel Microsoft 365 Apps Advanced IV

Practice 3.5. Programming using the R language I.

Practice 3.6. Programming using the R language II.

Practice 3.7. Programming using the R language III

Methodology

The teaching will be given in a mixed mode, combining theoretical and practical face-to-face sessions with practical face-to-face sessions in the computer room.

Operating rules in the classroom.

Attendance is not mandatory. Access to the classroom will not be allowed after the first 5 minutes of class. Entrances and exits will not be allowed, except for justified reasons, while the class is being taught

While the class is being taught, the use of mobile phones will not be allowed. The material necessary for following the subject will be projected on the screen.

The students will remain silent in the classroom, they can make comments related to the subject with the classmates next to them, always in a low voice to avoid disturbing the rest of the students.

IF THE STUDENTS DO NOT RESPECT THIS RULE, THE CLASS WILL BE SUSPENDED, LEAVING THE SUBJECT DEVELOPED FOR FACT.

Type of activity	Description	Student face-to-face activity		Non-present student activity		Evaluation	total time
		Targets	Hours	Student work	Hours	Hours	Hours

Master lesson BLOCK 1	Master class (Classroom. Large group)	Explanation of the main concepts	8	Study: Knowing, understanding and synthesizing knowledge	**12**	**2**	**22**
Problems and Cases BLOCK 1	Participatory class (Classroom. Large group)	Application of theoretical concepts taught in lectures	12	Solve problems and cases and apply it to a specific evaluable case	**14**	**2**	**28**
Problems and Cases BLOCK 2	Master class (Classroom. Large group)	Explanation of the main concepts	16	Study: knowing, understanding and synthesizing knowledge	**16**	**2**	**34**
Computer room BLOCK 2	Practical activity (Medium group)	Implementation of practices	24	Carry out course work and memory of the practical activities	**30**	**12**	**66**
Totals			**60**		**72**	**18**	**150**

* 25 hours of total activity have been considered for each ECTS crèdit

Development plan

Type of activity	content	Targets	Face-to-face hours	Accumulated hours	Evaluation
Master lesson	B1-Topic 1	1, 2	2	2	Theoretical and practical exam + Evaluation of practical cases
Master lesson	B1-Topic 2	1, 2	1	3	
Problems and cases	B1-Topic 2	1, 2	1	4	
Master lesson	B1-Topic 3	1, 2	2	6	
Problems and cases	B1-Topic 3	1, 2	2	8	
Master lesson	B1-Topic 4	1, 2	2	10	
Problems and cases	B1-Topic 4	1, 2	4	14	
Master lesson	B1-Topic 5	1, 2	2	16	
Problems and cases	B1-Topic 5	1, 2	5	20	

Master lesson	B2-Topic 1	3, 4	1	21	Theoretical and practical exam + Practical activities 1.1 and 1.2 + Advanced MSWord document with practical case with contents of the lectures applying the knowledge acquired in the practical sessions
Master lesson	B2-Topic 2	3, 4	3	24	
computer room	B2-Practice 1.1	3, 4	2	26	
Master lesson	B2-Topic 3	3, 4	4	30	
computer room	B2-Practice 1.2	3, 4	2	32	
computer room	B2-Practice 2.1	5	2	34	
computer room	B2-Practice 2.2	5	2	36	
computer room	B2-Practice 2.3	5	2	38	
computer room	B2-Practice 2.4	5	2	40	
computer room	B2-Practice 2.5	5	2	42	
computer room	B2-Practice 2.6	5	2	44	
computer room	B2-Practice 3.1	6	2	46	Delivered practices: one corresponding to the MSExcel spreadsheet and another with the R programming language
computer room	B2-Practice 3.2	6	2	48	
computer room	B2-Practice 3.3	6	2	50	
computer room	B2-Practice 3.4	6	2	52	
Master lesson	B2-Topic 4	2	2	54	
computer room	B2-Practice 3.5	7	2	56	
computer room	B2-Practice 3.6	7	2	58	
computer room	B2-Practice 3.7	7	2	60	
total			60		

Evaluation

EVALUATION

The evaluation of the subject will be done through continuous and separate evaluation for Block 1 (Statistics) and for Block 2 (Computer Science). The subject will be considered passed when the student gets an overall grade equal to or higher than 5 out of 10 points. However, it is necessary to get a grade equal to or higher than 4 out of 10 points in both blocks in order to pass the subject. If in any block a grade lower than 4 out of 10 points is obtained after the corresponding recoveries, the final overall grade will be the average grade obtained if it is lower than 4.9 out of 10 points or 4.9 out of 10 points, as maximum, if the average grade is approved, the subject will be graded in the minutes with a 4.9.

The evaluation of each block will be carried out as follows:

BLOCK 1 - STATISTICS

Block 1 has a weight of 34% in the final grade of the subject.

There will be 2 types of tests, the activities that have a weight of 20% of the statistics part and the exam that has a weight of 80%. Only the exam can be retaken. The exam can consist of two parts, one that will be written without a computer and the other with a computer. In the event that there is a practical part (computer) you must obtain a minimum grade of 3 out of 10 in the written part, in case of failure the practical part will not be corrected. If the

exam consists of two parts, each part will have the same weight.

	Statistical part	Subject (34%)
Activities	20%	6.8%
Examination	80%	27.2%

BLOCK 2 - COMPUTING

Block 2 has a weight of 66% in the final grade of the subject.

theoretical -practical exam of all subjects that will have a weight of 30% of the final mark of the subject. The grade obtained in this exam may be increased up to 1 point out of 10 according to the grade obtained in the activities delivered in practice 1 (1.1 and 1.2). The date of the exam is set by the Directorate of Studies and can be consulted on the GEF website. In addition, topic 3 and advanced text editing practices will be assessed together through a paper, with a weight of 20% of the subject's final mark. The rest of the practical's will be evaluated through two papers, one corresponding to the MSExcel spreadsheet and another with the programming language R, with a total weight of 16% of the final grade of the subject.

IT IS ESSENTIAL TO GET A MINIMUM OF 3 points out of 10 in the Block 2 exam IN ORDER TO BE ABLE TO PASS BLOCK 2 AND, THEREFORE, THE SUBJECT. Students who do not reach 3 points out of 10 will have a maximum grade of Block 2 of 3.5 points. The only grade that can be recovered is that of the exam, which will be recovered in the recovery exam set by the director of studies. The practice grade and the coursework grade WILL NOT BE RECOVERABLE.

Attendance at the different sessions of Block 2 is not mandatory. However, an attendance check will be carried out for the practical sessions and the teaching staff reserves the right to summon students who have not attended certain sessions in order to explain orally, with the corresponding computer support, how they have solved any of the practices. In these cases, the grade for the practices that the student did not attend will be provisional (as long as he submitted it within the deadline established for all students) until it is validated after the oral session. Once the oral session has been completed, the grade can be confirmed or lowered according to the faculty's discretion.

ASSEMBLY OF THE SUBJECT

Type of activity	**Procedure**	**number**	**Weight activity (%)**
Master lesson BLOCK 1	Examination	**1**	**27.2**
Computer room BLOCK 1	Activities	**2**	**6.8**
Master lesson BLOCK 2	Theoretical -practical exam	**1**	**30**
Computer room BLOCK 2	Coursework with MSWord	**1**	**20**
Computer room BLOCK 2	Delivery of practices spreadsheet and programming with R	**2**	**16**
total			**100**

Observations

If any student cannot follow the continuous assessment, they must notify the subject coordinator at the start of classes.

To be able to make a fair assessment for all students, plagiarism in the activities carried out will be meticulously pursued. Any plagiarized activity will count 0 points in the assessment. **In case of plagiarism in any non-recoverable activity, the subject will be automatically suspended.**

Alternative assessment

The alternative assessment will consist of a written exam of the part that has an exam and will account for 57.2% of the grade. There will be an exam on the date of the last call set by the center, and the corresponding recovery on the date established in the calendar. The rest of the grade (42.8%) will be assessed with the corresponding activities, practices and assignments of each block.

Bibliography

Basic bibliography

Block 1

CANAVOS, C. George Probability and Statistics. Applications and methods . Mc Graw Hill , 1992.

COLOMER C, MªÀ. Statistics course in Problems. Editions of the University of Lleida and FV libros , 1999.

Block 2

MINGUET, JM and READ, T Informática fundamental Ed. Ramón Areces University

SERRA, M. and BAÑERES, D. (coordinators) Fundamentals of computers UOC

Various MSWord and MSExcel manuals updated to the version used in the computer classroom.

Complementary bibliography

Block 1

GARCÍA PÉREZ, A. Applied Statistics: concepts basic _ National Distance Education University , 1992

MONTGOMERY. DC, and RUNGER, G. Probability and Statistics applied to engineering . Mc Graw Hill, 1996

Block 2

ARANDA, MC and others Fundamentals of computer science University of Malaga