2023/2024

Epidemiology and Statistics

Code: 102643
ECTS Credits: 6

Degree	Type	Year	Semester
2502445 Veterinary Medicine	OB	2	1

Contact

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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.

Teachers

Alberto Allepuz Palau

Prerequisites

It is highly recommended to have an adequate knowledge of mathematics.

Objectives and Contextualisation

The Epidemiology and Statistics course is of the second year and is a compulsory subject of the degree of Veterinary studies. The subject introduces in the bases of the application of the statistics to the veterinary sciences and in the basic concepts of epidemiology that allow to understand the evolution of the diseases in the populations.

The objective of the subject is that the student knows the terminology and the methods used in statistics and in epidemiology.

The specific objectives are that the student knows:

- What are the basic statistical tests and in what situations can they be used.

- Apply the basic statistical tests and interpret the numerical results.

- Know the behavior of diseases and infections in animal populations.

- Design and carry out simple epidemiological studies.

- Apply the most appropriate study and epidemiological methods in each case.

- Develop the analytical and critical capabilities of an epidemiological study.

Competences

- Analyse, synthesise and resolve problems and make decisions.
- Apply scientific method to professional practice, including medicine
- Apply the basics governing the transmission and maintenance of diseases in animal populations.
- Assess and undertake epidemiological studies and therapeutic and preventive programs in accordance with the standards of animal welfare, animal health and public health.
- Demonstrate knowledge and use of statistical concepts and methods applicable to veterinary science.
- Diagnose different individual and collective animal diseases, and know about prevention measures, with emphasis on zoonoses and notifiable disease.
- Value and interpret the production and health parameters of one animal group, considering the economic and welfare aspects.

Learning Outcomes

1. Analyse, synthesise and resolve problems and make decisions.
2. Apply appropriate statistical methods to different types of epidemiological studies.
3. Apply concepts related with the transmission and maintenance of diseases in populations to the analysis of real-life situations.
4. Apply scientific method to professional practice, including medicine
5. Apply the concepts of statistics and epidemiology to the analysis of production and health parameters.
6. Calculate and interpret measures of position and dispersion applicable to a data series.
7. Define the epidemiological and statistical bases of evidence-based medicine.
8. Describe the basic foundations of disease prevention programs.
9. Design and perform simple epidemiological studies, selecting the most suitable for each case.
10. Develop the capacity for critical appraisal of epidemiological studies.
11. Distinguish the different types of epidemiological studies and their utility.
12. Explain the evolution of diseases in populations and the factors that determine the same.
13. Identify the pathways and methods for transmitting diseases.
14. Properly evaluate the efficiency of a diagnostic test in terms of its application to a population.
15. Recognise and describe basic causality and causal inference, and their relationship with statistics.
16. Recognise the statistical distributions of a variable.
17. Select, apply and interpret the most commonly used parametric and non-parametric statistical methods in veterinary science.

Content

Master classes

Presentation and introduction

Block 1: Basic concepts in epidemiology and statistics

Methods of transmission and maintenance of the infection

Determinants of disease

Measures of disease frequency

Temporal and spatial distribution of the disease

Descriptive statistics

Probability and random variables

Diagnostic tests

Block 2: Epidemiological studies

Population and sample, parameters and estimators. Confidence intervals

Sampling

Types of epidemiological studies

Association and impact measures

Sampling in epidemiological studies

Bias, interaction and confusion

Introduction to hypothesis contrast and p-value

Analysis of variance

Ji-square test

Linear regression

Block 3: Economics and disease control

Basic rate of reproduction of the disease and characteristics of the host and the agent that may affect it

Technical bases for disease control

Economics of the disease

Computer practices - face-to-face:

Introduction to the program R. Estad. description

Hypothesis and ANOVA tests

Problems about diagnostic methods and disease rates

Analysis and interpretation of data in the context of an epidemiological study

Ji-square test and regression

Classroom debate - face-to-face:

Statistical problems

Design of epidemiological studies

Analysis and interpretation of data in the context of an epidemiological study

Methodology

The teaching methodology will involve classes that we will try to be as participatory as possible.

We will also do synchronous practical classes in which students will have to obtain the statistical and epidemiological parameters of different databases.

At the same time, students will have to prepare some problems that will later be discussed in class and any doubts that may arise will be solved and they will have to prepare two oral presentations that will be discussed in the classroom.

*The proposed teaching methodology may experience some modifications depending on the restrictions to face-to-face activities enforced by health authorities."

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			
Computer work	10	0.4	1, 4, 5, 2, 6, 9, 15, 16, 17
Debate at class	6	0.24	
Lectures	34	1.36	4, 5, 2, 8, 10, 11, 12, 13, 15, 16, 17
Type: Supervised			
Development of works	30	1.2	1, 4, 5, 3, 2, 6, 8, 10, 9, 12, 13, 15, 16, 17
Type: Autonomous			
Self study	65	2.6	4, 3, 8, 10, 9, 11, 12, 13, 15, 16

Assessment

Continuous Evaluation

Attendance at practical classes (face-to-face or synchronous) is mandatory to pass the subject.

The final grade is calculated based on:

1. Statistical exam (30% of the mark). The exam will be of short questions and problems.

2. Epidemiology exam (40% of the mark). The exam will be of test and short questions.

3. Three exercises (30% of the mark).

3.1 Assistance and deliveries of the statistical practices (5% of the mark)

3.2. Oral presentation on design of epidemiological studies (10% of the mark)

3.3. Oral presentation on analysis and interpretation of data in the context of an epidemiological study (15% of the mark)

To pass, you must get a minimum of 5 in each of the exams. In the last week you will be able to make up the exam and the two analysis papers of a database. In case of having to go to make up, the student will have to present himself for the part that has below 5. Students who, having passed, want to raise their grade, must take into account that only the last exam will be evaluated.

Single Evaluation

The single evaluation consists of a test that includes an exam on the statistics part, with a weight of 35%, and another exam on the epidemiology part, with a weight of 40%. On the same day, there will be an oral presentation of the work on the design of epidemiological studies with a weight of 10%, and another on analysis and interpretation of data in the context of an epidemiological study (15% of the mark). The grade obtained that day in these tests is 100% of the final grade of the subject.

To pass the subject you need to get a 5 from the statistics part and another 5 from the epidemiology part.

The single evaluation test will coincide with the same date fixed in the calendar for the last continuous evaluation test and the same recovery system will be applied as for the continuous evaluation. Students who, having passed, want to raise their grade, must take into account that only the last exam will be assessed.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Assistance and deliverables of statistical practices	0,05	0	0	1, 4, 3, 2, 6, 10, 11, 12, 13, 15, 16, 17, 14
Epidemiology exam	0,4	1.5	0.06	1, 3, 2, 7, 8, 10, 9, 11, 12, 13, 15, 14
Oral presentation on analysis and interpretation of data in the context of an epidemiological study	0,15	2	0.08	1, 4, 5, 3, 2, 7, 8, 10, 9, 11, 12, 13
Oral presentation on design of epidemiological studies	0,1	0	0	1, 4, 5, 3, 7, 10, 9, 11, 12, 13
Statistical exam	0,3	1.5	0.06	1, 5, 2, 6, 15, 16, 17

Bibliography

Thrusfield, M. (2005) Veterinary Epidemiology. (4ª ed.) Ed. Willey Blackwell. Online available in the UAB library.

Delgado, R., Probabilidades y estadística para ciencias e ingenierías, Delta Publicaciones 2008

Milton, J.S, . Estadística para Biología y Ciencias de la Salud. Mc- Graw Hill Interamericana (2001).

Petrie A.Watson P., Statistics for Veterinary and Animal Science (3d. ed.) Wiley-Blackwell, 2013.

Software

R (https://www.r-project.org/)