

28403 - Epidemiology and biostatistics

Syllabus Information

Academic year: 2024/25

Subject: 28403 - Epidemiology and biostatistics

Faculty / School: 105 - Facultad de Veterinaria

Degree: 451 - Degree in Veterinary Science

ECTS: 6.0

Year: 1

Semester: Annual

Subject type: Compulsory

Module:

1. General information

The objective is to be able to apply the scientific method, supported by a correct epidemiological and statistical study of the data obtained in an observational or experimental study in order to allow an adequate knowledge of animal populations and the diseases that affect them.

It is a compulsory subject integrated by two subjects belonging to different modules within the Veterinary Degree: Epidemiology (Clinical Sciences and Animal Health) and Biostatistics (Common Core Training). It has a teaching load of 6 ECTS (4 Epidemiology and 2 Biostatistics) and is taught annually during the first year of the degree.

2. Learning results

The student, in order to pass this subject, must demonstrate in the field of Biostatistics that:

1. Is able to describe statistically a set of experimental data.
2. Is able to recognize the most common probability distributions in biomedical sciences.
3. Is able to identify the probabilistic model that best fits a set of experimental data.
4. Is able to draw conclusions about the statistical parameters of a population from a sample.
5. Is able to analyse possible regression models between two quantitative variables.
6. Is able to use computer tools to solve the problems that arise in the previous sections.

The student, in order to pass this subject, must demonstrate in the field of Epidemiology that:

1. Understands the basic elements of qualitative epidemiology and the relationships between pathogen, host, environment and disease
2. Is able to adequately interpret the results of a diagnostic test in terms of reliability.
3. Is capable of designing and carrying out a sample collection appropriate to the objective of the proposed study
4. Is able to characterize the health status of a population
5. Is capable of identifying and weighing the possible risk factors that determine the health status of an individual in a population.
6. Understands the factors affecting decision making and is able to make decisions rationally and objectively.

3. Syllabus

THEORETICAL ISSUES IN EPIDEMIOLOGY

Topic Epi1: Types of variables and measurement scales

Topic Epi2: Introduction to Epidemiology

Topic Epi3 Evaluation of diagnostic tests

Topic Epi4: Sampling

Topic Epi5: Elements of Qualitative Epidemiology

Topic Epi6: Causality

Topic Epi7: Epidemiological surveys

Topic Epi8: Design of epidemiological studies
Topic Epi9: Cross-sectional observational studies
Topic Epi10: Longitudinal observational studies
Topic Epi11: Risk estimation
Topic Epi12: Decision theory

THEORETICAL TOPICS IN BIOSTATISTICS

BS1 Topic: Frequencies
BS2 Topic: Descriptive statistics
BS3 Topic: Probability distributions
BS4 Topic: Conditional probability
BS5 Topic: Statistical Inference I: Confidence Intervals
BS6 Topic: Statistical inference II: hypothesis testing
BS7 Topic: Statistical inference III: selection of statistical tests of statistical contrast
BS8 Topic: Correlation and linear regression models
BS_prob problems: Probability problems
BS_inf problems Statistical inference problems

EPIDEMIOLOGY PRACTICES

Practice Epi1: Diagnostic tests
Practice Epi2: Sample size calculation
Practice Epi3: Stratified results. Weighted averages and differences between proportions
Practice Epi4: Cross-sectional measures of disease
Practice Epi5: Longitudinal measures of disease
Practice Epi6: Risk estimation
Epidemiological Study

BIOSTATISTICS PRACTICES

Practice BS1: Probability distributions and conditional probability
Practice BS2 Practice: Descriptive statistics
Practice BS3: Introduction to Statistical Inference
Practice BS4: Correlation analysis. Simple Linear Regression

4. Academic activities

- Theoretical lectures: 8 topics of Biostatistics (10 hours) and 12 theoretical topics of Epidemiology (24 hours) will be taught in the classroom
- Classroom problem solving: 2 sessions of Biostatistics (2 hours)
- Practices: 4 sessions of Biostatistics (8 hours) and 6 sessions of Epidemiology (10.5 hours) will be taught in a computer classroom
- Epidemiological study: taught in a computer classroom in 2 sessions (5.5 hours)
- Practical work of the student: performance of continuous assessment activities and personal study
- Individual and group tutoring, including voluntary review sessions.
- Exams: two mid-term exams

5. Assessment system

The distribution of the grade for each subject is proportional to the ECTS of each one, and is based on the following activities whose weight in the final grade is indicated in parentheses:

- 1) Continuous assessment of theoretical knowledge of 20 topics through the teaching platform of the subject (<http://alp4eb.winepi.net>), based on multiple choice questions, correspondences and problems with documentary support (21.8%).

2) Problem solving in practical sessions: The same platform is used to carry out exercises (problem solving and interpretation of results) corresponding to 10 practices carried out in the computer classroom (13.2%).

3) Epidemiological study: It consists of the resolution of a virtual study that includes all the practices carried out and is developed in the 2nd semester in two face-to-face sessions (15%).

4) Midterm exams (50%, where it is necessary to obtain at least 4.5 points in each exam to average with the grade obtained in activities 1, 2 and 3):

1. Biostatistics: 10 test questions (20%), with penalty equal to $1/(\text{options}-1)$ and one problem (80%)

2. Epidemiology: 20 test questions (30%), with the same penalty, and 4 development questions including problem solving (70%).

5) Participation in voluntary activities to be carried out in and out of the classroom (additional 5%) will be valued.

In case of not taking the continuous assessment activities, 100% of the global evaluation will correspond to the on-site exams described in point 4. However, a minimum grade of 5 must be obtained in both exams in order to pass the subject.

6. Sustainable Development Goals

2 - Zero Hunger

3 - Good Health & Well-Being