Statistica (2 CFU; 21 hours – 15 T + 6 Ex)

Learning outcomes: by the end of the course, the student learns the basic concepts of the statistical methodology, with a particular focus on the biological applications: she/he is able to interpret simple statistical tests on biomedical data.

Subjects and acquired skills	Topics	Specific contents	Hours
INTRODUCTION TO THE COURSE		*Introduction to the course programme, assessment methods and teaching material.*	0,5
1) *INTRODUCTION TO STATISTICS (1,5 н)* (*acquisition of:* *a) What statistics is and its importance in veterinary;* *b) Idea of statistical variable;* *c) Introduction to epidemiological studies.)*	**Definition of statistics and variable**	*Definition of statistics and contextualization in veterinary field. Statistical variables and their different types. Statistical units.*	0,5
	Epidemiological studies	*Difference between population and sample. Main types of epidemiological studies. Difference between descriptive and inferential statistics.*	1
2) *DESCRIPTIVE STATISTICS (6 н)* (*acquisition of:* *a) Idea of dataset;* *b) Univariate descriptive techniques;* *c) Bivariate descriptive techniques aimed at assessing the relationship between two variables.)*	**Data matrix**	*Data collection and their inclusion in a data matrix.*	0,5
	Frequency distribution	*Frequency distribution tables: absolute and relative frequencies. Plot: bar plot and histogram.*	1
	Location measures	*Mode, rank based measures like median and quartiles, arithmetic mean.*	1
	Variability measures	*Variance, standard deviation and coefficient of variation.*	1
	Linear transformation	*Definition of linear transformation and related behaviour of the arithmetic mean and the standard deviation. Data standardization.*	0,5
	Association between two variables	*Bivariate frequency distribution and conditional distributions. Statistical independence in distribution, independence in mean and linear independence.*	2

3) INTRODUCTION TO PROBABILITY (2 H) (acquisition of: a) Introductory concepts of probability theory; b) Definition of random variable and a review of the most common probability distributions.)	**Concepts of probability**	Random experiment, event space and events. Definition of probability and introduction to the idea of independence and conditional probability.	1
	Random variables	Definition and examples of random variables both with continuous and discrete support. Focus on the standard Gaussian distribution.	1
3) INFERENTIAL STATISTICS (4 H) (acquisition of: a) Random sample, sample random variable (mean and variance); b) Point and interval estimation; c) Statistical tests and their interpretation.)	**Estimation**	Random sample, statistics and estimators. Normality assumption and estimation of population mean and variance. Point estimation and interval estimation.	2
	Hypothesis testing	Fundamental concepts of hypothesis testing. The case of the t-test for the comparison of means from two independent samples. Interpretation of ANOVA and independence chi-square tests.	3
TUTORIALS (6 H)	Exercises on lectures topics.		6