28403 - Epidemiology and biostatistics

Información del Plan Docente

Academic Year	2018/19
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

1.1.Aims of the course

The subject and its due results answer to the following expositions and targets:

The exposition in this subject departs from the situation of need that is created before a scientific study of realizing a correct epidemiologic and statistical analysis. The quality of the research work will be of major quality, the better and the more rigorous is the epidemiologic and statistical study that we realize.

The general target therefore is, from the experimental results and the formulation of a hypothesis, to be capable of obtaining the scientific thesis endorsed by a correct epidemiologic and statistical study.

1.2.Context and importance of this course in the degree

The subject Epidemiology and Biostatistics is a compulsory subject and it is integrated by two matters given by lectures from two different areas: Epidemiology (Area of Animal Health) and Biostatistics (Area of Applied Mathematics). Also this subject presents the peculiarity of which both matters belong to different modules inside the Grade in Veterinarian: Epidemiology (Clinical Sciences and Animal Health) and Biostatistics (Common Basic training). It has a teaching load of 6 ECTS (4 Epidemiology and 2 Biostatistics) and has annual character, being given during the first course of the Grade.

The contents of these two matters are the base for a correct use of the scientific method in the context of the veterinary sciences, as well as to allow a suitable knowledge of the animal populations and of the illnesses that affect them. In case of the matter Biostatistics there develop specially the competencies defined as the Order ECI/333/2008 as *Biometrics and statistics applied to the veterinary sciences* and *Dynamics and demography of the infection and the poisoning*, while the matter Epidemiology the developed competencies are: *Transmission and maintenance of the illnesses and methods of study of the illnesses in the populations, Diagnosis Epidemiology and diagnosis, System of pursuit and alertness, The investigation of sprouts of food toxi-infections and Dynamics and demography of the infection and the poisoning*.

Due to the basic character of this subject, its overcoming must qualify the students for the pursuit of the rest of specific subjects of the qualifications.

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1.3.Recommendations to take this course

It is advisable to have studied subjects of Mathematics and Statistics in the courses before to the revenue in the Grade, as well as to have a few basic computer skills.

2.Learning goals

2.1.Competences

On having overcome the subject, the student will be more competent for ...

1. To make use of a scientific reasoning, with critical character, in the analysis, synthesis and evaluation of epidemiologic models and real statisticians.

2. To apply the knowledge acquired to the analysis and search of the model that better represents a set of experimental information, and to confirm properly the above mentioned solutions.

3. To use the computer applications relative to the ambience of study.

4. To use Internet as an information source, as well as mass communication media.

5. To dominate the aspects of the communication, both oral and written.

6. To show capacity of organization and autonomous planning of the work.

7. To apply appropriately the probability distributions to the different situations observed in Veterinary Sciences.

8. To understand the mechanisms of transmission and maintenance of the illness / infection in the animal populations.

9. To design, to realize and to analyze epidemiologic studies, including sampling, measurement of illness and detection of factors of risk.

2.2.Learning goals

The student, to overcome this subject, will have to demonstrate in the ambience of the matter of Biostatistics that

1. It is capable of describing as per statistics a set of experimental information.
2. It is capable of recognizing the most habitual probability distributions in biomedical sciences.
3. It is capable of identifying the model probabilístico that better fits to a set of experimental information.
4. It is capable of extracting conclusions on the statistical parameters of a population from a sample.
5. It is capable of analyzing possible retrogression models between two quantitative variables.
6. It is capable of using computer hardware to solve the problems that arise in the previous paragraphs.

The student, to overcome this subject, will have to demonstrate in the ambience of the matter of Epidemiology

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that

1. It comprises the basic elements of the qualitative epidemiology and the relations between pathogenic, host, ambience and illness

2. It is capable of interpreting appropriately the results of a diagnostic test in reliability terms.

3. It is capable of designing and of realizing a capture of samples adapted to the target of the raised study

4. It is capable of characterizing the sanitary state of a population

5. It is capable of identifying and of considering the possible factors of risk that determine the sanitary state of an individual of a population.

6. It comprises the factors that they affect to the decision making and it is capable of taking decisions of rational and objective form.

2.3.Importance of learning goals

These learning results are fundamental to qualify the students of a solid base that allows them to confront in the best conditions the most specific rest of modules of character of the qualifications, and this way to shape successfully its professional profile.

Also, with the works in the practice rooms there is encouraged the strengthening of the generic or transverse competences that they contribute to its integral formation like postgraduates, especially the work in team and the use of computer hardware.

3.Assessment (1st and 2nd call)

3.1.Assessment tasks (description of tasks, marking system and assessment criteria)

The student will have to demonstrate that it has reached the results of learning foreseen by means of the following activities of evaluation

1) Evaluation of theoretical knowledge and its application to a real context: It is based on the resolution of different activities on the teaching platform of the subject (multiple answers, mails, problems...) with documentary support and of progressive form. First of all there includes activities "key" not evaluable whose correct resolution is necessary to keep on gaining access to the activities (included theoretical cards). The activities evaluables are specific for every student and they are distributed in 20 topics with different individual weighting as its relevancy (to see **Annex I**) whose entire sum is proportional to the number of ECTS of every matter, so that in the final qualification the Biostatistics activities are 10% of the final qualification and the Epidemiology activities are 20% of the final qualification.

2) Evaluation of the problem solving in the practical meetings: Since in the previous case it is a question of specific problems for every student whose access can depend on the previous and obligatory resolution of activities "key". They are distributed in 10 practices with different individual weighting as its relevancy (to see **Annex II**) whose entire sum is proportional to the number of ECTS of every matter, so that in the final qualification the Biostatistics activities are 6,7% of the final qualification and the Epidemiology activities are 13,3% of the final qualification.

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3) Epidemiologic study: It is a question of a study based on the securing of samples of a (virtual) porcine development that provides information of quantitative and qualitative variables that will be analyzed of form integrated from the epidemiologic and biostatistical point of view applying the methods and skills learned previously. This activity is realized in the second half of the second semester with the support of two practical meetings attend them and he supposes 20% of the final qualification being necessary to obtain 50% of the maximum qualification (5 on 10) so that the continued evaluation is valid.

4) Written tests: Two partial examinations will be carried out corresponding to each matter. The first partial examination corresponds with subjects of Biostatistics and it have 10 questions of multiple choice and one question of development, and total score is 16.7% of final qualification. The second partial examination corresponds with subjects of Biostatistics and it have 20 questions of multiple choice and four questions of development, and total score is 33.37% of final qualification.

For questions of multiple choice penalize the incorrect answers with 1 divided one by the number of incorrect options. It will be necessary to obtain at least 50% of the maximum qualification in every examination. The questions of development evaluate the aptitude to solve problems of reasoned form and to apply appropriately the basic theoretical concepts to the context of the raised problems.

5) Also there will be valued the participation in different voluntary activities that will be realized along course, so much of form presencial as not presencial: cumplimentación of the self-assessment activities before the teaching of the corresponding theoretical class, collaboration in activities in theoretical classes, assistance to voluntary seminars... According to the programmed activities every course, this punctuation increase will suppose an additional maximum of 10% to the final note.

Scores corresponding to activities 1, 2 and 3 will be kept for next courses.

In order to sum the raised continued evaluation up the following table is included:

Activity	**Matter**	**Weighting**	
1. Evaluation of theoretical knowledge and its application to a real context	Epi	14.6%	21.8%
	BS	7.2%	
2. Evaluation of the problem solving in the practical meetings	Epi	8.4%	13.2%
	BS	4.8%	
3. Epidemiologic study	-	15.0%	15.0%

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4. Written test	Epi	33.3%*	50.0%
	BS	16.7%*	
5. Voluntary activities		5.0%**	5.0%**
Total		**100%**	**100%**

* It is necessary to obtain 45% of the maximum punctuation

** It is a question of the maximum additional punctuation for participation in voluntary activities.

Criteria for evaluation and levels of demand

First of all it is necessary to bear in mind that the subject is divided in two matters of knowledge (Epidemiology and Biostatistics), which as we will see have its coordinated and integrated learning activities. Nevertheless on having talked each other of matters belonging to different modules, it is necessary to guarantee that the evaluation is established so that they go to need a few minimums in every matter.

The result of the global sum of the qualifications of activities of evaluation will have to be equal or superior to 5, but also, as it has been indicated in the previous paragraph, in the written test of both matters should have to obtain a minimal punctuation of 45% of the maximum possible qualification in order to average with rest of the activities.

Qualifications system:

0-4,9: Failure (SS).

5,0-6,9: Pass (AP).

7,0-8,9: Notable (NT).

9,0-10: Understudy (SB).

The qualifications system will express itself by means of numerical qualification in accordance with the established in the

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article 5 of the Royal Decree 1125/2003 of September 5 (BOE September 18), by which there is established the European system of credits and the system of qualifications in the university qualifications of official character and validity in the whole national territory.

Annex I: Distribution of theoretical topics for matter and relative weighting

Order	Subject	Weighting
Epi1	Type of variables and scales of measurement	0,53%
Epi2	Introduction to the Epidemiology	1,05%
Epi3	Evaluation of diagnostic tests	1,58%
Epi4	Sampling	1,58%
Epi5	Qualitative Epidemiology	3,05%
Epi6	Causality	0,53%
Epi7	Epidemiologic survey	1,05%
Epi8	Design of epidemiologic studies	1,05%
Epi9	Study observacionales transverse	1,05%
Epi10	Study observacionales longitudinal	1,05%
Epi11	Estimation of the risk	1,05%
Epi12	Decision theory	1,05%

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BS1	Probability Distributions	1,20%
BS2	Conditional Probability	0,60%
BS3	Frequencies	0,60%
BS4	Descriptive Statistics	0,60%
BS5	Statistical inference I: confidence intervals	0,60%
BS6	Statistical inference II: hypothesis contrast	1,20%
BS7	Statistical inference III: selection of tests of statistical contrast	0,60%
BS8	Models of interrelation and retrogression	0,60%
BS_prob	Problems of probability	0,60%
BS_inf	Problems of statistical inference	0,60%

Annex II: Distribution of practical meetings for matter and relative weighting

Practice	**Weighting**
Epi1: Diagnostic tests	1,58%
Epi2: Calculation of size of sample	1,58%

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Epi3: Stratified results	1,05%
Epi4: Transverse illness measurements	1,05%
Epi5: Longitudinal illness measurements	1,58%
Epi6: Estimation of the risk	1,58%
BS1: Probability distributions	1,20%
BS2: Descriptive statistics	1,20%
BS3: Introduction to the Statistical inference	1,20%
BS4: Interrelation analysis. Simple Linear retrogression	1,20%

Matter	Theory	Practice	Total
Epidemiology	14,6%	8,4%	23,0%
Biostatistics	7,2%	4,8%	12,0%
Total	**21,8%**	**13,2%**	**35,0%**

4.Methodology, learning tasks, syllabus and resources

4.1.Methodological overview

The learning process that has been designed for this subject is based in

The subject is structured in two matters blocks: Epidemiology, and Biostatistics. The lectures (teaching method) comprise

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24 h of Epidemiology and 12 h of Biostatistics. The practical classes, which are given in meetings in computer classroom, comprise 12 h of Epidemiology; and 8 hours of Biostatistics.

For the lectures (teaching method), the pupils have previous access, across the teaching platform corresponding to the lesson that goes to work. So that it is important that they take the lesson read to assimilate better the class. The practical meetings will be carried out in classroom of computer science. The student must realize the steps following a script that will provide him to itself for every practice. Previously, the teacher has explained with an example each of the above mentioned steps.

4.2.Learning tasks

The program that offers itself the student to help him to achieve the due results comprises the following activities (the topics of both matters will be alternated to favor the knowledge integration).

THEORETICAL TOPICS OF EPIDEMIOLOGY

Topic Epi1: Types of variables and scales of measurement

Descriptors: Numerical and qualitative variables. Discreet and Continuous. Suitable measurements.

Competencies: To be able to recognize the basic types of variables in a set of experimental information, as well as its possible measurement scales.

Activities education - learning:

- Lectures (teaching method): 1 h

- I work on the part of the student: reading and comprehension of the theory, and achievement of the exercises, 1,5 h

Topic Epi2: Introduction to the Epidemiology

Descriptors: Historical precedents of the Epidemiology. Definition of Epidemiology. Uses of the Epidemiology. Differences between clinical medicine and epidemiology. Types of epidemiology. Examples of illnesses.

Competencies: To place to the Epidemiology in the frame of its historical evolution. To understand the Epidemiology concept. To know the targets of the Epidemiology. To be able to apply the epidemiologic method. To differ between Clinical medicine and Epidemiology.

Activities education - learning:

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- Lectures (teaching method): 2 h

- I work on the part of the student: reading and comprehension of the theory, and achievement of the exercises, 3 h

Topic Epi3: Evaluation of diagnostic tests

Descriptors: Evaluation of diagnostic tests: sensitivity, specificity and predictive values . Criteria of selection of diagnostic tests. Combination of diagnostic tests. Optimization of a diagnostic test. Congruity of two diagnostic tests (kappa).

Competencies: To be capable of evaluating the quality of a diagnostic test. To have objective criteria to select the diagnosis most adapted to every situation. To be capable of modifying the quality of a diagnostic test. To be capable of comparing two diagnostic tests.

Activities education - learning:

- Lectures (teaching method): 3 h

- I work on the part of the student: reading and comprehension of the theory, and achievement of the exercises, 4,5 h

Topic Epi4: Sampling

Descriptors: Basic sampling concepts. Typical of the sample. Factors to be considered: method of sampling and size of sample. Types of errors (systematical and random). Mechanisms of production of slants and errors. Sampling methods: probabilísticos and not probabilísticos. Factors that influence the sample size. Adjustments of the size of the sample. Calculation of size of sample (to detect illness, to estimate average, to estimate percentage and differences between percentages).

Competencies: To know the theoretical essentials of the sampling. To be capable of selecting the most suitable sampling method. To be capable of applying the formulae of calculation of size of sample.

Activities education - learning:

- Lectures (teaching method): 3 h

- I work on the part of the student: reading and comprehension of the theory, and achievement of the exercises, 4,5 h

Topic Epi5: Elements of Qualitative Epidemiology

Descriptors: Temporary evolution of the illness in an individual (period of latency, period of prepatency and incubation

period). Evolution of the illness in a population (epidemic curves, Kendal's strip of wood, Law of Charles-Nicole, presentation space - storm of the illness and Epidemic Index). Determinants of illness (agent, host and ambient). Transmission of the illness (infection sources, transmission mechanisms, transmission routes and strategies of maintenance of the infection).

Competencies: To distinguish between the different forms of temporary evolution of the illness. To be capable of integrating all the illness determinants in the context of an epidemiologic triad. To know how it is transmitted and maintains an illness in a population.

Activities education - learning:

- Lectures (teaching method): 2 h

- I work on the part of the student: reading and comprehension of the theory, and achievement of the exercises, 3 h

Topic Epi6: Causality

Descriptors: Introduction: Snieszko scheme. Causal reasoning. Causality criteria: (Cánones of Mill, Postulated of Henle-Koch, Postulated of Hill ...). Causal models (unicausal determinist, simple multicasual determinist, advanced multicasual determinist and probabilistic).

Competencies: To understand the evolution of the concept of causality. To be capable of realizing a causal reasoning. To understand the Henle-Koch postulates and to justify its limitations. To understand the postulates of Evans and other causality criteria. To differ between the different causal models.

Activities education - learning:

- Lectures (teaching method): 1 h

- I work on the part of the student: reading and comprehension of the theory, and achievement of the exercises, 1,5 h

Topic Epi7: Epidemiologic surveys

Descriptors: Definition of epidemiologic survey. Forms design (questions, answers, order, format...). Databases creation. Cumplimentación of surveys (method of collection of information, optimization of the valuation of answer, achievement of pilot survey, configuration of the team of work and cross-check and treatment of the information). Ethical considerations.

Competencies: To be capable of selecting the necessary information in an epidemiologic study. To be capable of discriminating between types of variables. To be capable of designing actively a questionnaire. To be able to gather information adapted for an epidemiologic investigation by means of surveys.

Activities education - learning:

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- Lectures (teaching method): 2 h

- I work on the part of the student: reading and comprehension of the theory, and achievement of the exercises, 3 h

Topic Epi8: Design of epidemiologic studies

Descriptors: Criteria of classification of the epidemiologic studies. Experimental studies (groups control, classification and masking): advantages and disadvantages. Observational studies (cross sectional, case-control and cohorts): scheme, advantages and disadvantages. Ecological studies. Sifted population.

Competencies: To differ between studies as the criteria of classification. To raise the different types of studies as the looked targets.

Activities education - learning:

- Lectures (teaching method): 2 h

- I work on the part of the student: reading and comprehension of the theory, and achievement of the exercises, 3 h

Topic Epi9: Cross-sectional observational studies

Descriptors: Basic concepts. Reasons (index, proportion and valuation). Definition of case and population in risk. Transverse measurements: morbidity or predominance, mortality and case fatality rate. Factors that influence the calculation: diagnostic reliability and size of sample. Raw values Specific vs: Valuations standardization

Competencies: To differ between valuation and proportion. To measure the illness in a moment of certain time. To minimize the influence of variables of confusion on having measured the illness

Activities education - learning:

- Lectures (teaching method): 2 h

- I work on the part of the student: reading and comprehension of the theory, and achievement of the exercises, 3 h

Topic Epi10: Llongitudinal obsevational studies

Descriptors: Longitudinal measurement of the illness: Predominance (Punctual Predominance and Period of Predominance) and Incidences (Piled up Incidence and Valuation of Incidence). Relations between appreciative.

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Competencies: To quantify the illness and its evolution throughout a period of time.

Activities education - learning:

- Lectures (teaching method): 2 h

- I work on the part of the student: reading and comprehension of the theory, and achievement of the exercises, 3 h

Topic Epi11: Estimation of the risk

Descriptors: Calculation and selection of appreciative of risk (Reason of Predominance, Odds Ratio and Relative Risk). Calculation of intervals of confidence. Interpretation of the risk. Appreciative others of effect (Attributable Risk, Fraction etiológica, Attributable Risk of the Population and Fraction etiológica of the Population).

Competencies: To select the appreciative one of risk most adapted to every type of study. To calculate the most suitable risk appreciative ones and to interpret the risk according to the type of study, appreciative selected and its confidence interval. To know appreciative others of interest related to the risk.

Activities education - learning:

- Lectures (teaching method): 2 h

- I work on the part of the student: reading and comprehension of the theory, and achievement of the exercises, 3 h

Topic Epi12: Decision theory

Descriptors: Decision under certainty (Mathematical Programming). Decision under risk: With experimentation (statistical inference) and without experimentation (bayesian probability): Awaited utility. Causes of illogical decisions. Necessary number to Harm. Decision under suspense (Theory of Games)

Competencies: To understand the different possible situations on having taken a decision. To apply the rules of decision bayesiana using epidemiologic results

Activities education - learning:

- Lectures (teaching method): 2 h

- I work on the part of the student: reading and comprehension of the theory, and achievement of the exercises, 3 h

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THEORETICAL TOPICS OF BIOSTATISTICS

Topic BS1: Probability distributions

Descriptors: Probability. Random variable: types and classification. Distribution of probability of a random variable. Discrete and continuous probability distributions in veterinary sciences. Other fundamental distributions in statistical inference.

Competencies: To be able to recognize the more used in veterinary sciences random variables and its probability distributions.

Activities education - learning:

- Lectures (teaching method): 2 h

- Student work: reading and comprehension of the theory, and and problem solving, 3 h

Topic BS2: Conditional probability

Descriptors: Conditional probability. Concept of independence of random variables. Bayes Theorem. Application to the interpretation of a diagnosis.

Competencies: To understand and to apply the concept of conditional probability. To recognize the independence between variables. To apply the Bayes theorem to the solving of real problems.

Activities education - learning:

- Lectures (teaching method): 1 h

- Student work: reading and comprehension of the theory, and problem solving, 1,5 h

Topic BS3: Frequencies

Descriptors: Frequency. Frequency Tables. Frequency tables for grouped and ungrouped data. Graphical Representation of Frequency Distribution.

Competencies: To be able, from a set of information, to obtain the frequency tables that describes the statistical

distribution of the data base.

Activities education - learning:

- Lectures (teaching method): 1 h

- Student work: reading and comprehension of the theory, and problem solving, 1,5 h

Topic BS4: Descriptive statistics

Descriptors: Descriptive statistics. Descriptive measures for a sample data. Moments measures (central tendency, variability and shape), and position measures (percentiles).

Competencies: To be able to obtain and to interpret with the suitable computer free software the descriptive measurements of a set of sample data.

Activities education - learning:

- Lectures (teaching method): 1 h

- Student work: reading and comprehension of the theory, and problem solving, 1,5 h

Topic BS5: Statistical inference I: confidence intervals

Descriptors: Definition of statistical inference. Sampling distribution of a given statistic based on a random sample. Obtaining a probability interval from the sampling distribution. Confidence intervals. Calculation of the confidence intervals most representative or used in the veterinary sciences.

Competencies: To be able to obtain and to interpret with the suitable computer free software the confidence intervals to do inferences on the population parameters.

Activities education - learning:

- Lectures (teaching method): 1 h

- Student work: reading and comprehension of the theory, and problem solving, 1,5 h

Topic BS6: Statistical inference II: hypothesis contrast

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Descriptors: Statistical hypothesis test. Definition of hypothesis test. Basic elements in a Test. Types of errors. The significance level. P-value concept.

Competencies: To understand the concept of statistical hypothesis test as another application of the statistical inference different from the estimation for confidence intervals. To be able of defining the basic hypothesis in the test. To be able to obtain and to explain the conclusion in a hypothesis test.

Activities education - learning:

- Lectures (teaching method): 2 h

- Student work: reading and comprehension of the theory, and problem solving, 3 h

Topic BS7: Statistical inference III: selection of tests of statistical contrast

Descriptors: Selection of the statistical test. Types of hypothesis testing. Parametric and nonparametric tests. The most commonly hypothesis tests used in statistical inference with application to the veterinary sciences.

Competencies: o be able to apply the adequate hypothesis test depending on the null hypothesis.

Activities education - learning:

- Lectures (teaching method): 1 h

- Student work: reading and comprehension of the theory, and problem solving, 1,5 h

Topic BS8: Correlation models and linear regression

Descriptors: Two-dimensional quantitative variables. Concept of linear correlation coefficient. Linear regression model. Linear correlation model. Obtaining the best fit or regression lines. Residual analysis in regression.

Competencies: To understand the concept of linear relation between two quantitative random variables. To distinguish between the correlation and the regression. To be able to calculate the correlation coefficient and the regression lines. To understand the analysis of the residuals.

Activities education - learning:

- Lectures (teaching method): 1 h

- Student work: reading and comprehension of the theory, and problem solving, 1,5 h

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Seminar BS_prob: Problems of probability

Descriptors: To solve problems related with topics BS1, BS2, BS3 y BS4.

Competencies: To apply concepts included in topics BS1, BS2, BS3 y BS4.

Activities education - learning:

- Practical seminar: 1 h

- Student work: to solve problems in classroom, 1,5 h

Seminar BS_inf: Problems of statistical inference

Descriptors: To solve problems related with topics BS5, BS6 y BS7.

Competencies: To apply concepts included in topics BS5, BS6 y BS7.

Activities education - learning:

- Practical seminar: 1 h

- Student work: to solve problems in classroom, 1,5 h

PRACTICES OF EPIDEMIOLOGY

Practice Epi1: Diagnostic tests

Descriptors and competencies: The correspondents to the topic Epi3.

Activities education - learning:

- Practical classes: 2 h

- I work on the part of the student: revision of theoretical concepts and review of the exercises 1 h

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Practice Epi2: Calculation of the size of sample

Descriptors and competencies: The correspondents to the topic Epi4.

Activities education - learning:

- Practical classes: 1,5 h

- I work on the part of the student: revision of theoretical concepts and review of the exercises 1 h

Practice Epi3: Stratified results. Average values and differences between proportions

Descriptors and competencies: he correspondents to the topics Epi4, Epi9 and BS7.

Activities education - learning:

- Practical classes: 1,5 h

- I work on the part of the student: revision of theoretical concepts and review of the exercises 1 h

Practice Epi4: Transverse illness measurements

Descriptors and competencies: The correspondents to the topics Epi4 and Epi9.

Activities education - learning:

- Practical classes: 2 h

- I work on the part of the student: revision of theoretical concepts and review of the exercises 1 h

Practice Epi5: Longitudinal illness measurements

Descriptors and competencies: The correspondents to the topics Epi4 and Epi10.

Activities education - learning:

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- Practical classes: 1,5 h

- I work on the part of the student: revision of theoretical concepts and review of the exercises 1 h

Practice Epi6: Estimation of the risk

Descriptors and competencies: The correspondents to the topics Epi4 and Epi11.

Activities education - learning:

- Practical classes: 2 h

- I work on the part of the student: revision of theoretical concepts and review of the exercises 1 h

Epidemiologic study

Descriptors and competencies: The correspondents to all the realized topics of the subject of form integrated across the resolution of an epidemiologic and statistical study of an animal population

Activities education - learning:

- Lectures (teaching method): 5,5 h (the first meeting of 2,5 h and the second meeting of 3 h)

- I work on the part of the student: reading and comprehension of the theory, and achievement of the exercises, 2 h

PRACTICES OF BIOSTATISTICS

Practice BS1: Probability distributions

Descriptors and competencies: The corresponding to the topics BS1, BS2 and BS3.

Activities education - learning:

- Practical classes: 2 h

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- I work on the part of the student: revision of theoretical concepts and review of the exercises 1 h

- Student work: reviewing of the theorical concepts associated to the topics, 1h.

Practice BS2: Descriptive statistics

Descriptors and competencies: The corresponding to the topics BS4 and BS5.

Activities education - learning:

- Practical classes: 2 h

- Student work: reviewing of the theorical concepts associated to the topics, 1h.

Practice BS3: Introduction to the Statistical inference

Descriptors and competencies: The corresponding to the topics BS6 and BS7.

Activities education - learning:

- Practical classes: 2 h

- Student work: reviewing of the theorical concepts associated to the topics, 1h.

Practice BS4: Correlation analysis. Simple Linear Regression

Descriptors and competencies: The corresponding to the topic BS8.

Activities education - learning:

- Practical classes: 2 h

- Student work: reviewing of the theorical concepts associated to the topics, 1h.

Summary of the activities of education - learning

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Activity	Presential Hours	Factor	Autonomous work /No Attend	Total
Classes of theory	34	1,5	51	84
Seminars and problems	2	1,5	4	6
Practices	24	0,5	12	36
Practical work			15	15
Tutorships			5	5
Examinations			4	4
Total	**60**		**90**	**150**

4.3.Syllabus

The topics of both matters will be alternated to favor the knowledge integration, and it can change lightly the order depending on the academic calendar in force. All the changes will be notified across the teaching platform of the subject (http://alp4eb.winepi.net).

THEORETICAL TOPICS OF EPIDEMIOLOGY

Topic Epi1: Types of variables and scales of measurement

Topic Epi2: Introduction to the Epidemiology

Topic Epi3: Evaluation of diagnostic tests

Topic Epi4: Sampling

Topic Epi5: Elements of Qualitative Epidemiology

Topic Epi6: Causality

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Topic Epi7: Epidemiologic surveys

Topic Epi8: Design of epidemiologic studies

Topic Epi9: Cross-sectional observational studies

Topic Epi10: Longitudinal observational studies

Topic Epi11: Estimation of the risk

Topic Epi12: Decision theory

THEORETICAL TOPICS OF BIOSTATISTICS

Topic BS1: Probability distributions

Topic BS2: Conditional probability

Topic BS3: Frequencies

Topic BS4: Descriptive statistics

Topic BS5: Statistical inference I: confidence intervals

Topic BS6: Statistical inference II: hypothesis contrast

Topic BS7: Statistical inference III: selection of tests of statistical contrast

Topic BS8: Models of interrelation and linear retrogression

Seminar BS_prob: Problems of probability

Seminar BS_inf: Problems of statistical inference

PRACTICES OF EPIDEMIOLOGY

Practice Epi1: Diagnostic tests

28403 - Epidemiology and biostatistics

Practice Epi2: Calculation of the size of sample

Practice Epi3: Stratified results. Average values and differences between proportions

Practice Epi4: Transverse illness measurements

Practice Epi5: Longitudinal illness measurements

Practice Epi6: Estimation of the risk

Epidemiologic study

PRACTICES OF BIOSTATISTICS

Practice BS1: Probability distributions

Practice BS2: Descriptive statistics

Practice BS3: Introduction to the Statistical inference

Practice BS4: Correlation analysis. Simple Linear Regression

4.4.Course planning and calendar

Meetings calendar attend them and works presentation

The dates and key milestones of the subject are described in detail, together with those of the rest of subjects of the first course in the Veterinarian's Grade, on the Web page of the Veterinarian's faculty (http://veterinaria.unizar.es/gradoveterinaria/). The above mentioned linkage will be updated to the beginning of every academic course.

Also they will be available of form more detailed across the teaching platform of the subject (http://alp4eb.winepi.net).

4.5.Bibliography and recommended resources