Universidad Zaragoza

Academic Year/course: 2022/23

28404 - Basic sciences for veterinarians

Syllabus Information

Academic Year: 2022/23
Subject: 28404 - Basic sciences for veterinarians
Faculty / School: 105 - Facultad de Veterinaria
Degree: 451 - Degree in Veterinary Science
ECTS: 6.0
Year: 1
Semester: First semester
Subject Type: Basic Education
Module:

1. General information

1.1. Aims of the course

The general aim of this subject is to ensure that students acquire a basic scientific training, which in turn is necessary for the understanding and analysis of the disciplines of the degree. On the other hand, through lab sessions, the student will learn to treat data and interpret results with critical sense, as well as to present their work reports, in which this critical sense is appreciated, as much in the content as in the continent of the same ones.

The SDGs associated with these objectives are:

- Goal 4: Quality Education
- Goal 5: Gender Equality

1.2. Context and importance of this course in the degree

Due to the basic character of this subject, its passing must enable students to follow the rest of the course specific subjects of the degree.

1.3. Recommendations to take this course

Although this is a basic training subject, it is advisable to take subjects in Physics, Mathematics and Chemistry prior entering the degree.

2. Learning goals

2.1. Competences

On successful completion of this course, students will be able to:

1. Making use of scientific reasoning, with a critical character, in the analysis, synthesis and evaluation of real models, both physical and chemical.
2. Applying the acquired knowledge to the analysis and search of solution of problems. Contrast properly

such solutions.

1. Using the computer applications related to the field of study.
2. Managing the basic instruments of chemistry and physics laboratories.
3. Using the Internet as a source of information, as well as a means of communication.
4. Master the aspects of communication, both oral and written. Demonstrate the ability to organise and plan work autonomously.

2.2. Learning goals

If students complete the course successfully, they should be able to

1. Obtain a function that adjusts a set of data, both theoretical and experimental.
2. Obtain the approximate value of a function at a point, when this function is not known.
3. Identify mathematical models that describe a system of populations.
4. Classify these models and obtaining the evolution of the population.
5. Use computer tools to solve the problems that arise in the previous sections.
6. Express concentration in its different forms.
7. Identify and interpreting chemical balances.
8. Identify the structures of organic compounds.
9. Name and formulate hydrocarbons and organic compounds with different functional groups.
10. Distinguish and recognizing asymmetric carbons and chiral molecules.
11. Handle chemical laboratory instruments, preparing dissolutions and working with them.
12. Identify the fundamental magnitudes of physics such as length, mass, temperature and time that appear in the problems to be solved.
13. Solve problems related to the basic knowledge of Fluids and Thermodynamics necessary for the subsequent studies of the career.
14. Apply the knowledge of the physical phenomena acquired in the previous sections to the laboratory practices.
15. Report on his work in chemistry and physics laboratories

2.3. Importance of learning goals

These learning outcomes are fundamental for, along with the other competencies that are acquired with the others subjects that make up the Basic Training Module, training students on a solid foundation that allows them to face the rest of the more specific modules of the degree in the best conditions, and thus shape their professional profile successfully.

In addition, laboratory work promotes the strengthening of generic or cross-cutting competencies that contribute to their integral formation as graduates.

3. Assessment (1st and 2nd call)

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

Assessment activities

The student must demonstrate that has achieved the expected learning outcomes by means of the following evaluation activities.

The subject is divided into three blocks of knowledge, Mathematics, Chemistry and Physics. The assessment will be for each block of content, with required minimums in each block to pass the entire subject. Both practice and theoretical competences will be assessed.

Each subject is evaluated independently, performing a partial test at the end of each one. Each subject will be evaluated with a maximum of 10 points, according to the following proportion:

- Theory - up to 70% of the final grade

- Practice - up to 30% of final grade

Students who have not passed any of the subjects with this methodology of continuous assessment, are entitled to a final test on the official dates convened by the Center, which will include a theoretical test and another practical, with the percentages mentioned above. In any case, every student has the right to this test on official announcement, whose grade will prevail over any grade previously obtained.

In order to pass each subject, it is necessary to obtain a minimum of 40% in each of the parts (theory and practice). The final grade of the subject will be obtained by averaging the grade of the three subjects, provided that a minimum grade of 4 is obtained in each subject.

In addition:

- A score between 4 and 5 in any subject may be offset with the rest of the subjects ONLY during the same academic year.

- The subject that obtains a grade superior or equal to 5, is considered passed for successive courses.

- Practices evaluated with a minimum of 40% are considered passed for successive courses.

Valuation criteria and requirement levels

It is a continuous assessment system, for which aptitudes are evaluated, regarding the capacity of scientific reasoning, the application of the acquired knowledge in the analysis and resolution of real problems. In face-to-face activities, the acquisition of transversal skills will be better appreciated and assessed. The students could be punished with up to a 10% of the practices grade when he/she didn?t satisfy the rules that are of due compliance in laboratories, computer room, etc.

At the end of each subject, the student will have an examination of the subject (midterm exams), both in theory and in practice. In order to pass the midterm exam, students must obtain an average greater than or equal to 5. There is no need to take the final examination for those students who have managed to pass their midterm exams.

On the other hand, once a subject has been passed in the first session, this grade is saved for next sessions (so, a student who passes physics in the first exam, but not mathematics and chemistry, must take mathematics and chemistry in the next session).

The global test in the official calls, will consist of a written test, resolution of problems that comprises 70% of the qualification and a practical test, with 30%.

In order to pass the subject through the global test, the student must reach at least 40% of the grade in each of the evaluation activities for the three subjects. The final grade, the sum of these activities, should be 5, or higher.

Marking system:

According to the national regulation Law 1025/2003, 5th of September which lays down the European system of credits and marking system for the university degree:

0-4,9: FAIL.

5,0-6,9: PASS

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

9,0-10: EXCELLENT (SB).

As the article 158 of the Statutes of the University of Zaragoza lays down, provisional grades will be displayed at least for 7 days and students will be able to review them on the date, time and place provided for that purpose

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

DISCLAIMER

The English version is a translation of the original in Spanish for information purposes only. In case of a discrepancy, the Spanish original will prevail.

The course is divided into three blocks of different subjects. Each of one of these blocks has 7 hours of lectures, 4 hours of solving cases and problems and 9 hours of laboratory practical lessons.

Before the lectures, students will have the possibility to access to the corresponding material in the learning platform. Then, we carefully recommend a previous reading of this material for better assimilation. The material available to students at the learning platform includes so presentations of the theoretical concepts, as collections of problems proposed for each of them.

In addition, students will be provided of the scripts corresponding to the laboratory practical lessons. The problems sessions are working sessions in small groups, the teacher will propose some real problems at the beginning of the session and, at the end of the session will be solved on the board. The practical two-hour sessions will take place in the computer classroom, for math?s, analytical chemistry laboratory, for chemistry, and physics laboratory for physics. The student must complete the steps corresponding to the script provided for each practical lesson. Previously, the teacher will explain with an example each one of these steps.

4.2. Learning tasks

PART I: MATHEMATICS

Block I. Review of the basic calculus concepts

Competences:

1. To be able to know the basic elements related to real functions of real variable, and the meaning of the continuity and derivability in real situations.
2. To be able to intuit the graph of a real function and to interpret it inside of each of the real context, to obtain conclusions about of the evolution of the process this function is describing. Then, to be able to take decisions.

Teaching and learning activities:

- Lectures: 0 lecture hours.
- Practice session (computer classroom): 1 session of 2 hours.
- Autonomous work and study: 7 hours.

Block II. Approximation

Competences:

1. To be able to recognize the problems where the analytic solution is not easy and understand the possibility of use the approximation theory to solve them, with a previously fixed precision.
2. To be able to distinguish the problems where the data belongs to a theoretical model, and the others where the data

are experimental.

Teaching and learning activities:

- Lectures: 4 lecture hours.
- Practice seasons (computer classroom): 2 session of 2 hours.
- Problems: 1.5 hours of problems session at the classroom.
- Autonomous work and study: 14 hours.

Block III. Elementary discrete models

Competences:

To be able to understand the equation describing of a population grow. From this equation, to obtain the model of the population grow and the main conclusions about its evolution. To know the basic models of population grow.

Teaching and learning activities:

- Lectures: 4 lecture hours.
- Practice seasons (computer classroom): 1 session of 2 hours.
- Problems: 1.5 hours of problems session at the classroom.
- Autonomous work and study: 14 hours.

PART II: CHEMISTRY

Block I. General Chemistry

Competences:

1. To be able to know the different ways of expressing concentration.
2. To be able to transform the different expressions of concentration each other.
3. To be able to understand and resolve the issues that the expression of concentration is involved. Understanding the colligative properties of solutions.
4. To be able to understand and interpret chemical balances. Understanding the operation of the buffers and their operation and importance in living organisms.

Teaching and learning activities:

1. Lectures: 4 lecture hours.
2. Practice seasons (laboratory): 4 sessions of 2 hours.
3. Problems: 3 hours of problems session at the classroom
4. Autonomous work and study: 7 hours.

Block II. Organic Chemistry

Competences:

1. To be able to know the importance of organic chemistry, the characteristics of organic compounds, the different expressions of the molecular formulas.
2. To be able to know the structures of organic compounds. Know the difference between radical, functional group and homologous series. Knowing name and make hydrocarbons and organic compounds with different functional groups.
3. Know the difference between conformational, geometric and optical isomerism. Recognize the asymmetric carbons and chiral molecules. Understand and recognize the importance of chirality in biology.

Teaching and learning activities:

1. Lectures: 4 lecture hours.
2. Problems: 1 hour of problems session at the classroom
3. Autonomous work and study: 14 hours.

PART III: PHYSICS

Block I. Fluids

Competences:

1. To be able to know the physical basis of fluids applicable to veterinary science.
2. To be able to understand the behavior of blood as a fluid.

Teaching and learning activities:

- Lectures: 4 lecture hours.
- Practice seasons: 2 sessions of 2 hours.
- Problems: 2 hours of problem solving at the classroom.

Block II. Thermodynamics

Competences:

In addition to those described in paragraph 3 as generic, the student must acquire the following competences:

1. To be able to know the physical basis of thermodynamics that apply to the veterinary science.
2. To be able to understand the animal metabolism.
3. To be able to understand the thermoregulation processes in animals.

Teaching and learning activities:

- Lectures: 4 lecture hours.
- Practice seasons: 1 sessions of 2 hours. An exam of 1 hour.
- Problems: 4 hours of problem solving at the classroom.

4.3. Syllabus

PART I: MATHEMATICS

Block I. Review of the basic calculus concepts

Topics: Real functions of real variable. Limits, continuity and derivability. Graphical representation of functions. Basic mathematical functions. Biological models.

Block II. Approximation

Topics: Defining the problem of approximation. Interpolation and Lagrange method. How to fit a function to a data base.

Lineal fit and Least Squared method. Other fitting methods.

Block III. Elementary discrete models

Topics: Introduction to the elementary discrete models. Difference equations. Solution of the Difference Equations. Order 1 and 2. Populations grow.

PART II: CHEMISTRY

Block I. General Chemistry

Topics: Chemical solutions. Colligative properties of solutions. Electrolytes. Chemical equilibria. Acid-base equilibria. Buffer solutions. Amino acids.

Block II. Organic Chemistry

Topics: Introduction to Organic Chemistry. Nomenclature and Formulation of organic compounds. Constitutional isomerism and stereoisomerism.

PART III: PHYSICS

Block I. Fluids

Topics: Fluid statics. Pressure. Surface phenomena in fluids. Fluid dynamics. Viscosity. Hemodynamics (pressure, flow and resistance).

Block II. Thermodynamics

Topics: First Law of Thermodynamics. Heat and temperature. Heat capacity. Phase changes and latent heat. Heat transfer: conduction, convection and radiation. Temperature regulation and animal metabolism.

4.4. Course planning and calendar

It can be found on the website of the Faculty.

4.5. Bibliography and recommended resources

http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=28404