

66861 - Advanced tools for diagnosis and prevention

Syllabus Information

Academic year: 2024/25

Subject: 66861 - Advanced tools for diagnosis and prevention

Faculty / School: 105 - Facultad de Veterinaria

Degree: 617 - Master's in Global Health: Integration of Environmental, Human and Animal Health

ECTS: 6.0

Year: 1

Semester: Annual

Subject type: Optional

Module:

1. General information

The main objective of the subject is the management and integration of different molecular, genetic, microbiological and anatomopathological techniques for their application to the diagnosis and prevention of diseases. The theoretical classes will introduce the student to the basics of the tools and their applications. There will also be practical classes, where this knowledge will be applied to the design of new diagnostics or vaccines and the interpretation of results.

These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda (<https://www.un.org/sustainabledevelopment/es/>): SDG 3 Health and Well-being (Objective 3.3., 3.B), SDG 4 Quality Education (Objective 4.4), SDG 5 Gender Equality (Objective 5.5), SDG 8 Decent Work and Economic Growth (Objective 8.5), SDG 12 Responsible Production and Consumption (Objective 12.2), SDG 16 Peace, Justice and Strong Institutions (Objective 16.6) and SDG 17 Partnerships to Achieve the Goals (Objective 17.17).

It is advisable that the student has previous knowledge of genetics, biochemistry and microbiology.

2. Learning results

Upon completion of this subject, the student will be able to:

- Know how to apply standard and advanced microbiological identification methods, reference methods as well as ISO and good practice standards to make a proper diagnosis.
- Understand the new diagnostic tools based on imaging or molecular analysis.
- Understand the process of vaccine design and production.
- Identify new non-vaccine preventive methods.
- Learn about the application of pharmacogenomics in personalized treatment.

3. Syllabus

Topic 1: tools based on nucleic acid detection.

Topic 2: tools based on protein analysis.

Topic 3: diagnosis of microorganisms in tissues.

Topic 4: phenotypic diagnosis of microorganisms.

Topic 5: genotypic diagnosis of microorganisms.

Topic 6: molecular epidemiology.

Topic 7: regulation and reference Diagnostics.

Topic 8: biomarkers.

Topic 9: personalized medicine.

Topic 10: vaccine design.

Topic 11: research and development of new vaccines against tuberculosis.

Topic 12: strategies for vaccine formulation.

Topic 13: vaccine safety.

Topic 14: non-vaccine alternatives to the use of antibiotics.

Topic 15: transfer of research results.

4. Academic activities

Master class: 35 hours

Theoretical-practical sessions in which the contents of the subject will be explained.

Problem solving and case studies: 2 hours

Diagnosis of a classroom case study using the Genially tool

Practical classes: 21 hours

Practice I. Design and analysis of qPCR results

Practice II. Protein analysis

Practice III: necropsies

Practice IV: histological techniques

Practice V: microscopic identification in tissues

Practice VI: phenotypic diagnosis of microorganisms

Practice VII: genotypic and genomic diagnosis of microorganisms

Teaching assignments: 30 hours

Individual or group work: bibliographic review of the diagnostic and preventive tools used in a disease chosen by the student. Preparation of a report and presentation in the classroom.

Autonomous student work: 30 h

Assessment tests: 2 hours

5. Assessment system

TEST 1: individual written test of multiple-choice questions on the theoretical contents of the subject (30 % of the grade. A minimum grade of 5 out of 10 is required to pass it).

Assessment criteria: mastery of the basic theoretical contents of the subject.

TEST 2: individual written test of multiple-choice questions on the contents of each practice (the average of the tests of the different practices represents 20% of the grade. A minimum grade of 5 out of 10 is required to pass it).

Assessment criteria: understanding of the objective and acquisition of basic skills.

TEST 3: case study solving (20% of the final grade, complete solving of the case)

In groups, students will have to demonstrate their ability to interpret the results of different diagnostic tests by solving a specific clinical case in the classroom. A brief report on the steps followed will be made.

Assessment criteria: use of appropriate terminology and justification of arguments.

TEST 4: report and public presentation of the theoretical work (30% of the grade. A minimum grade of 5 out of 10 is required to pass it).

The bibliographic review work will be presented individually or in groups. It will consist of a written work and its presentation in the classroom.

Assessment criteria: knowledge, understanding and interpretation of diagnostic methodologies and preventive measures (60%); quality of presentation (40%). The entire group will receive equal marks.

Global test: students who do not opt for continuous assessment or who do not pass the subject by this method, are entitled to take a global test consisting of a written test that assessed the theoretical and practical contents of the subject. This test will be graded from 0 to 10 points. Assessment criteria: the written test will account for 100% of the final grade and will take place during the official examination period of the University of Zaragoza.

6. Sustainable Development Goals

3 - Good Health & Well-Being

4 - Quality Education

8 - Decent Work and Economic Growth