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|------------------|-----------------------------|----------------|--|
| Course Unit      | Microbiology and Immunology | Field of study | Biology and Biochemistry               |
| Bachelor in      | Veterinary Nursing          | School         | School of Agriculture                  |
| Academic Year    | 2020/2021                   | Year of study  | 1                                      |
| Type             | Semestral                   | Semester       | 1                                      |
| Level            | 1-1                         | ECTS credits   | 6.0                                    |
| Code             | 9085-671-1105-00-20         |                |  |
| Workload (hours) | 162                         | Contact hours  | T 30 TP - PL 30 TC - S - E - OT 20 O - |

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) **Joaquina Teresa Gaudêncio Dias, Angela Sofia Feitor Fernandes**

### Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:

1. To understand the mechanisms evolved in interactions between microorganisms and environment, humans and animals.
2. To correlate the physiological characteristics of microorganisms with pathogenicity.
3. To understand the basic concepts of infection, epidemiology, immunity, diagnosis, pathogenicity, prevention and chemotherapy of microbial infections

### Prerequisites

Before the course unit the learner is expected to be able to:  
Not applicable

### Course contents

Taxonomy. Morphology and structure of bacteria and fungi. Nutrition and growth. Cells and organs of immune system; antigens, antibody and TCR. Complement. Humoral and cellular immunity. Hypersensitivity, tolerance/auto-immunity. Laboratory classes: Control of microorganisms; pure culture and staining techniques; microbial growth; microbial susceptibility to chemotherapeutic agents; total and differential counting of leukocytes, immunoprecipitation and immunodiffusion tests.

### Course contents (extended version)

1. Microbiology as a science.
2. Prokaryotic cell structure and morphology
3. Classification system of living organisms.
4. Cultivation and growth of microorganisms.
5. Bacterial pathogenicity
6. Overviews of the immune system
7. Immunity and the immune response.
8. Hematopoiesis. Cells and organs of the immune system.
9. Humoral and cellular immunity. Antigens. Antibody – structure and classes.
10. Inflammation.
11. MHC molecules and genes. Antigen processing and presentation.
12. Immediate and delayed hypersensitivity.
13. Cells and colonies morphology. Preparation of culture media and sterilization.
14. Pure culture techniques. Staining techniques. Microbial susceptibility to chemotherapeutic agents.
  - identification of *S. aureus* coagulase positive from milk samples
15. Wright's staining of leukocytes. Counting of leukocytes and erythrocytes.
16. Double immunodiffusion and immunoprecipitation

### Recommended reading

1. Barroso et al. 2014. Microbiologia Médica. Lidel Edições técnicas, Volume I e II.
2. Ferreira et al. 2010. Microbiologia. Lidel Edições Técnicas, Volume I e II.
3. Quinn et al. , 2015. Concise Review of Veterinary Microbiology. 2ª edição. John Wiley & Sons Inc.
4. Day, M. , Schultz, R. , 2014. Veterinary Immunology: Principles and Practice. 2ª edição, Taylor & Francis Ltd.
5. Tizard, I. 2012. Veterinary Immunology: An Introduction. 9ª edição, Elsevier - Health Sciences Division.

### Teaching and learning methods

Conventional lectures; use of power point presentations and internet resources. Laboratory classes. Course materials available in the e-learning platform.

### Assessment methods

1. coursework - (Regular) (Final, Supplementary, Special)
  - Intermediate Written Test - 30% (1st written exam)
  - Final Written Exam - 30% (Final written exam)
  - Practical Work - 30% (Written laboratory exam)
  - Case Studies - 10% (Presentation of a scientific work)
2. Final written exam - (Student Worker) (Final, Supplementary, Special)
  - Final Written Exam - 100% (written exam)

### Language of instruction

Portuguese

### Electronic validation

|                                |  |                              |                              |
|--------------------------------|--|------------------------------|------------------------------|
| Joaquina Teresa Gaudêncio Dias | Maria Letícia Miranda Fernandes<br>Estevinho | Hélder Miranda Pires Quintas | Maria José Miranda Arabolaza |
| 16-11-2020                     | 16-11-2020                                   | 17-11-2020                   | 17-11-2020                   |