Course Unit	Virology and Animal Cell Culture			Field of study	Veterinary Technology								
Bachelor in	Veterinary Nursing			School	School of Agriculture								
Academic Year	2019/2020	Year of study	2	Level	1-2	ECTS credits	6.0						
Type	Semestral	Semester	2	Code	9085-408-2205-00-19								
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): Hélder Miranda Pires Quintas, Joaquina Teresa Gaudêncio Dias, Manuel Ricardo Costa Calhelha

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
1. Learn the fundaments of viral taxonomy, viral replication, genetics and evolution, virus cell-interactions, mechanism of infection and viral spread, determinants of viral virulence and host resistance
2. Learn the fundaments of immune response to viral infections and pathogenesis of viral disease.
3. Be familiar with laboratory diagnosis of viral diseases.
4. Understand the concepts of surveillance, prevention, control and eradication of viral diseases with special attention to zoonotic agents.
5. Learn the fundaments of prions: agents of transmissible spongiform encephalopathies.
6. Know the most important applications for animal cell culture.
7. Perform correctly the main procedures used in animal cell culture.

Prerequisites

Before the course unit the learner is expected to be able to:
The students should have previous knowledge of biochemistry, physiology, histology and genetics.

Course contents

Structure and taxonomy of viruses. Viral replication and genetics. Methods used for viral studies. Immune system response to virus. Effect of virus in cells. Vaccines and Antiviral Drugs. Laboratory Diagnosis of Viral Infection. Prions. Biology of animal cells. Equipment, consumables and reagents used in animal cell culture. Culture and subculture of animal cells: isolation, primary cultures and cell lines. Animal cell culture applications.

Course contents (extended version)

1. General Characteristics, Structure and Taxonomy of Viruses
   - Viral Structure
   - Viral Taxonomy
2. Cultivation and Characterization of Viruses
   - Viral Propagation Methods
   - Concentration and Purification of Viruses
   - Infectivity and Storage
   - Virus Visualization
   - Direct Enumeration of Viruses
   - Indirect Enumeration of Viruses
   - Miscellaneous Methods used for Characterization
3. Viral Replication and Genetics
   - Viral Replication of DNA and RNA viruses.
   - Viral Genetics
   - Interactions Between Two Viruses
   - Virus Applications: Gene Therapy and Recombinant Vaccines
4. Virus-Cell Interactions, Viral Pathogenesis and host defenses to viruses.
   - Interaction Between Viruses and Host Cells
   - Pathogenesis of Viral Infections
   - Host Defenses
   - Immunological Effects of Viral Infection.
5. Prevention of Viral Diseases, Vaccines and Antiviral Drugs
   - Vaccines
   - Passive Immunization
   - Herd Immunity
   - Antiviral Drugs
6. Laboratory Diagnosis of Viral Infections
   - Diagnostic Approaches
   - Virus Isolation
   - Virus Neutralization
   - Protection Tests
   - Collection and Submission of Specimens
7. Families with Viruses of Veterinary Significance
   - Circoviridae, Parvoviridae, Poxviridae, Herpesviridae, Papillomaviridae, Adenoviridae, Asfarviridae.
   - Retroviridae, Reoviridae , Paramyxoviridae Rhabdoviridae, Orthomyxovirida, Picornaviridae
   - Picornaviridae, Caliciviridae, Coronaviridae, Arteriviridae, Togaviridae and Flaviviridae.
8. Bacteriophages, viroids and virusoids.
9. Prions and Transmissible Spongiform Encephalopathies
   - Prion Characteristics
   - Transmissible Spongiform Encephalopathies of Animals
   - Scrapie
   - Bovine Spongiform Encephalopathy
   - Feline Spongiform Encephalopathy
   - Transmissible Encephalopathy of Mink
   - Chronic Wasting Disease of Deer and Elk
   - Spongiform Encephalopathy in Captive Ruminants
   - Human Transmissible Spongiform Encephalopathies
10. Culture of animal cells: basic technique.
   - Animal cell biology
   - Equipment, consumables and reagents used in animal cell culture
   - Culture and subculture of animal cells: isolation, primary cultures and cell lines
   - Characterization and stipulation of cell lines
   - Animal cell culture applications

Recommended reading

1. Aiello, S. , Moses, M. , 2016. The Merck Veterinary Manual. 11ª edição, Merck - Elsevier Health Sciences.
2. Barthold et al. , 2011. Fenner's Veterinary Virology. 4ª edição, Elsevier, Academic Press, EUA, 534 pp.
3. Freshney, R. , 2016. Culture of Animal Cells: A Manual of Basic Technique and Specialized Applications. 7ª edição, John Wiley & Sons Inc, NY, EUA, 728 p.
4. Johnson, A. , 2014. Small Animal Pathology for Veterinary Technicians. John Wiley & Sons Inc NY, EUA, 240 pp.
5. Quinn, P. , Markey, B. , Carter, M. , Donnelly W. , Leonard, F. , 2011. Veterinary Microbiology and Microbial Diseases. Wiley-Blackwell, NJ, EUA, 928 pp.

Teaching and learning methods

Lectures will be support by media and multimedia resources. Practical classes will engage direct working with animals and laboratory practices. Everyone is expected to contribute actively to discussions. Non present hours will involve training in a working environment. Graduate students are expected to work largely on their own initiative although with the close support and supervision of a tutor.

Assessment methods

1. Coursework - (Regular) (Final, Supplementary, Special)
   - Intermediate Written Test - 15% (1st written exam)
   - Intermediate Written Test - 15% (2nd written exam)
   - Intermediate Written Test - 30% (3th written exam)
   - Reports and Guides - 40% (1st written laboratory reports (10%)+2nd written laboratory reports(10%)+ 3th written reports (20%))
2. final written exam - (Student Worker) (Final, Supplementary, Special)
   - Final Written Exam - 60% (Final written exam)
   - Final Written Exam - 40% (written laboratory exam)

Language of instruction

Portuguese

Electronic validation

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06-11-2019	09-11-2019	10-11-2019	11-11-2019