

BMS2804: VETERINARY MICROBIOLOGY

Effective Term

Semester A 2022/23

Part I Course Overview

Course Title

Veterinary Microbiology

Subject Code

BMS - Biomedical Sciences

Course Number

2804

Academic Unit

Biomedical Sciences (BMS)

College/School

Jockey Club College of Veterinary Medicine and Life Sciences (VM)

Course Duration

One Semester

Credit Units

3

Level

B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Completion of all Year 1 courses with C grade or above

Precursors

Nil

Equivalent Courses

Nil

Exclusive Courses

Nil

Part II Course Details

Abstract

This course aims to:

- provide a broad introduction to the diversity of microorganisms including archaea, bacteria, fungi, protists and viruses and what they do in the world at large, in soils, air and waters, but with a strong emphasis on their role as symbionts and pathogens in the animal body;
- develop students' discovery attitude about microbes, skills at searching for and presenting information related to microbiology in clear and concise English;
- develop student skills to apply a problem-based learning approach to study microbiology events in our daily lives; and
- develop skills in basic microbiological techniques including culturing, smearing, staining, and antibiotic sensitivity testing.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if DEC-A1 DEC-A2 DEC-A3 app.)			
1	Identify and describe the diversity of archaea, bacteria, fungi, protists, viruses and their habitats and analyze the environmental factors that affect their growth.		x		
2	Identify and discuss the importance of microorganisms in and their role in the underlying basis of disease in a wide range of species and animal industries including impacts on public health (AVCB, RCVS).			x	x
3	Discover the different roles of microbes in our daily lives and apply basic microbiology concepts to solve daily problems related to microbiology issues.				x
4	Describe, compare and contrast the different agents and methods for control of microbial growth used in vitro and in the development of appropriate treatment plans for animals (RCVS).		x		
5	Gather and appraise information relating to microbiology, analyze and identify important messages from such information and present them in clear and concise English.			x	
6	Implement basic microbiological techniques in a laboratory setting			x	

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Teaching and Learning Activities (TLAs)

TLAs	Brief Description	CILO No.	Hours/week (if applicable)	
1	Lectures	Teaching and learning will be primarily based on interactive lectures and tutorials with activities designed to develop the discovery attitude in relation to microbes' role in animals and in our daily lives, along with complementary in-class and on-line discussions where students will be able to be involved in small group sharing, so they can learn to describe and discuss the related subject matters.	1, 2, 3	1.5 hours every week
2	Tutorials	Teaching and learning will be primarily based on interactive lectures and tutorials with activities designed to develop the discovery attitude in relation to microbes' role in animals and in our daily lives, along with complementary in-class and on-line discussions where students will be able to be involved in small group sharing, so they can learn to describe and discuss the related subject matters.	4, 5	0.5 hour every week
3	Laboratory classes	Implement basic microbiological techniques in a laboratory setting including culturing, smearing, staining, and antibiotic sensitivity testing.	6	2 hours every second week

Assessment Tasks / Activities (ATs)

ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)	
1	Tests	1, 2, 3	25	
2	Written assignments, scientific journal article review	1, 2, 3, 4	10	
3	Laboratory techniques	6	15	

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

3

Additional Information for ATs

Minimum Passing Requirement: A minimum of 30% in coursework as well as in examination, and the total minimum passing requirement for the whole BVM course is 50%.

Assessment Rubrics (AR)

Assessment Task

1. Tests

Criterion

To verify the status of students' learning progress

Excellent (A+, A, A-)

High competence

Good (B+, B, B-)

Good competence

Fair (C+, C, C-)

Basic competence

Marginal (D)

Some deficiencies

Failure (F)

Lack of competence

Assessment Task

2. Written assignments, scientific journal article review

Criterion

Encourage students to think critically by allowing them to review and criticize the current scientific article

Excellent (A+, A, A-)

High competence

Good (B+, B, B-)

Good competence

Fair (C+, C, C-)

Basic competence

Marginal (D)

Some deficiencies

Failure (F)

Lack of competence

Assessment Task

3. Laboratory techniques

Criterion

Ability to produce a usable Gram stain and to plate uncontaminated colonies

Excellent (A+, A, A-)

High competence

Good (B+, B, B-)

Good competence

Fair (C+, C, C-)

Basic competence

Marginal (D)

Some deficiencies

Failure (F)

Lack of competence

Assessment Task

4. Examination

Criterion

To test students' application of material taught in class and evaluate their performance

Excellent (A+, A, A-)

High competence

Good (B+, B, B-)

Good competence

Fair (C+, C, C-)

Basic competence

Marginal (D)

Some deficiencies

Failure (F)

Lack of competence

Part III Other Information

Keyword Syllabus

1. Microbial diversity of archaea, bacteria, fungi, protists, viruses
- physiological diversity (chemoorganotroph, chemolithotroph, phototroph, heterotroph, autotroph)

- microbial systematics (phenotypic, genotypic, phylogenetic analysis)
- 2. Microbial growth
 - exponential growth
 - measuring microbial growth
 - environmental factors affecting growth
- 3. Microbial ecology
 - methods in microbial ecology (isolation, T-RFLP, DGGE)
 - how microbes interact with each other
 - descriptions of major microbial habitats
 - biofilms
- 4. The roles of microorganisms in animal health and disease, and in food safety
- 5. Microbial interactions with animals
 - normal microbial flora
 - microbial diseases (airborne, vectorborne, waterborne, foodborne, direct contact transmitted)
- 6. Microbial growth control
 - physical antimicrobial control
 - chemical antimicrobial control
 - antimicrobial drugs, in particular antibiotics and their mode of action

Reading List

Compulsory Readings

Title	
1	D. Scott McVey, Melissa Kennedy, M. M. Chengappa (2013). <i>Veterinary Microbiology</i> (3rd edition). Wiley-Blackwell.

Additional Readings

Title	
1	J.W. Deacon (2006). <i>Fungal Biology</i> . Blackwell Publishing Limited.
2	Michael T. Madigan, John M. Martinko, David Stahl and David P. Clark (2010). <i>Brock Biology of Microorganisms</i> , 13th ed. Benjamin Cummings.
3	Timoney, J., Gillespie, J., Scott, F., and Barlough, J. (2009). <i>Hagan and Bruner's Microbiology and Infectious Diseases of Domestic Animals</i> . <i>The Nutritional Microbiology of Farm Animals</i> by D.N. Kamra and N.N. Pathak
4	Nikam, P. (2013). <i>Veterinary Microbiology: Bacterial and Fungal Agents of Animal Disease</i> .