# VM4000: HOST, AGENT AND DEFENCE

**Effective Term**
Semester A 2024/25

## Part I Course Overview

**Course Title**
Host, Agent and Defence

**Subject Code**
VM - Jockey Club College of Veterinary Medicine and Life Sciences
**Course Number**
4000

**Academic Unit**
Infectious Diseases and Public Health (PH)

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

**Course Duration**
One Semester

**Credit Units**
18

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

**Medium of Instruction**
English

**Medium of Assessment**
English

**Prerequisites**
Completion of Year 3 courses with C grade or above

**Precursors**
Nil

**Equivalent Courses**
Nil

**Exclusive Courses**
Nil

## Part II Course Details

### Abstract

This course teaches the interactions between the agents of infectious diseases and their hosts. It will provide an overview of the major bacteria, fungi, parasites and viruses that infect animals and give a summary of the diseases that these pathogens

cause. It will cover the concept of health, mechanisms of normal and abnormal host defenses, environmental factors that affect the host agent relationship and the methods and procedures used to diagnose and control infectious disease. It is presented through lectures that cover the major bacterial, fungal, parasitic and viral pathogens of animals, and tutorial cases that guide integrated learning of concepts and facts in multiple disciplines. The disciplines that are presented in this course are immunology, epidemiology, microbiology including virology, bacteriology, mycology, parasitology, pathology, clinical pathology, laboratory medicine, and therapeutics. Learning is supported by laboratories, computer modules and group discussions. Students will acquire a competent, integrated understanding of events and interactions that cause infectious disease in individuals and populations; methods and procedures that are used to recognize and diagnose infectious disease; and preventative veterinary medicine including monitoring. The primary focus will be on cattle, horses, sheep, pigs, poultry, dogs, and cats.

**Course Intended Learning Outcomes (CILOs)**

|  | CILOs | Weighting (if app.) | DEC-A1 | DEC-A2 | DEC-A3 |
|---|---|---|---|---|---|
| 1 | Formulate hypotheses for a given clinical presentation of an infectious disease based on available information and similarity to diseases studied in various components of thecourse | | x | x | |
| 2 | Design and justify a diagnostic plan that includes appropriate tests and procedures in a rational sequence. Explain the relationship between these test results and host/agent interactions | | x | x | |
| 3 | Design and justify a treatment plan using antimicrobial/anti-parasitic drugs, immunologic modulation, and supportive care. | | x | x | x |
| 4 | Design and justify a plan for disease prevention and control that includes, as appropriate, immunization, antimicrobial/anti-parasitic drugs, and changes in husbandry practice. | | x | x | x |
| 5 | Explain the pathogenesis of diseases, accounting for the biologic characteristics of the agent; environmental factors; and the events, interactions, and effects of the host inflammatory and immune responses | | x | x | |
| 6 | Determine and prioritize the pertinent facts of a case, Suggest and explain mechanisms that could account for or explain each fact or clinical sign. | | x | x | |
| 7 | Recognize and investigate disease outbreaks through analysis and interpretation of provided data. | | x | x | |
| 8 | Predict and interpret laboratory tests encountered in tutorial cases. Describe the principles and procedures of laboratory tests used to diagnose infectious disease and the source and handling of samples for the tests. | | x | x | |

| 9 | Recognize in smears and sections of tissue the components of an inflammatory exudate, classify the exudate, and relate the morphologic characteristics to probable duration and type of pathogen | | x | x | |
| 10 | Recognize organisms by their morphologic characteristics as presented in laboratories | | x | x | |
| 11 | Evaluate the importance of different host/agent interactions in relation to injury sustained by the host, and use this knowledge to predict the outcome of the interaction | | x | x | |
| 12 | Summarize a clinical case, in under 300 words or 5 minutes, including the pertinent facts, clinical signs, competing pathophysiological hypotheses, diagnostic strategy and rationale, and conclusions | | x | x | |
| 13 | Demonstrate team working skills relevant to professional practice and competence: Actively participate in small-group study sessions, Contribute to defining and achieving team objectives, Work and communicate effectively and empathetically with team members. | | x | x | 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.

**Learning and Teaching Activities (LTAs)**

| | LTAs | Brief Description | CILO No. | Hours/week (if applicable) |
|---|---|---|---|---|
| 1 | Lectures | Students will engage in formal lectures to gain knowledge on immunology, epidemiology, bacteriology, virology, parasitology, clinical pathology, systemic pathology, laboratory medicine and clinical pharmacology. Students will be introduced and be given explanations on the effects of bacteria, parasites, fungi, and viruses infections in each organ system while comparatively analyzing individual host organ systems affected by pathogens. Including epidemiology, and clinical pharmacology theories and practices. | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 | 5 hrs/wk |

| 2 | Problem-based learning Cases | Students will examine computer-based and real-world diagnostic cases to deepen their understanding of the clinical features, gross and histological lesions, and pathogenic mechanisms associated with various diseases. By analyzing these case studies, students will gain practical insights into the manifestation and progression of major animal health issues. At the end of each laboratory session, students will attend summary discussions that highlight the key concepts covered during the hands-on activities. These wrap-up sessions will provide students with opportunities to ask questions, clarify their understanding, and solidify their grasp of the important ideas presented. Students will complete a variety of learning exercises designed to complement the lectures and tutorial case studies. These activities will reinforce the students' learning of facts and concepts through hands-on performance of procedures, data analysis, and interactive computer-based simulations. By actively engaging with these learning exercises, students will deepen their understanding and develop practical skills. | 1, 2, 6, 12, 13 | 3 hrs/wk |
|---|---|---|---|---|

| 3 | Laboratories | Students will examine computer-based and real-world diagnostic cases to deepen their understanding of the clinical features, gross and histological lesions, and pathogenic mechanisms associated with various diseases. By analyzing these case studies, students will gain practical insights into the manifestation and progression of major animal health issues. At the end of each laboratory session, students will attend summary discussions that highlight the key concepts covered during the hands-on activities. These wrap-up sessions will provide students with opportunities to ask questions, clarify their understanding, and solidify their grasp of the important ideas presented. Students will complete a variety of learning exercises designed to complement the lectures and tutorial case studies. These activities will reinforce the students' learning of facts and concepts through hands-on performance of procedures, data analysis, and interactive computer-based simulations. By actively engaging with these learning exercises, students will deepen their understanding and develop practical skills. | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 | 4 hrs/wk |
|---|---|---|---|---|

| 4 | Minor Cases | Students will explore six interactive case studies presented as computer modules, which will expose them to selected diseases in a format similar to that of the tutorial cases. The topics of these minor case studies will relate to the ongoing or preceding major themes covered in the course, reinforcing the connections between different aspects of animal health and disease. By engaging with these interactive computer-based cases, students will have the opportunity to apply their knowledge and build practical skills in diagnosing, analyzing, and managing a variety of animal health issues. The interactive format of these case studies will allow students to actively participate in the learning process, fostering a deeper understanding of the subject matter. | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 | 1 hrs/wk |
|---|---|---|---|---|

| 5 | Infectious Disease Rounds | Students will participate in Integrated Discussion Rounds (IDRs) as large group discussions, engaging in an integrated, multidisciplinary exploration of the clinical aspects and biological mechanisms of a clinical case. These IDRs will complement the preceding tutorial case studies, providing students with opportunities to apply their knowledge and deepen their understanding of the interconnected nature of animal health and disease. Through the IDRs, students will collaborate with their peers and instructors to analyze the clinical presentation, diagnostic findings, and underlying biological processes involved in the selected case. This multidisciplinary approach will enable students to develop a more comprehensive and holistic perspective on the management of animal health issues, preparing them for the complexity they may encounter in real-world veterinary practice. | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 | 2 hrs/wk |

| 6 | Clinical Lectures | Students will engage in a lecture series that provides a clinical perspective. The lecture series will give students a clinical perspective on the diseases and conditions covered throughout the course, including the material presented in lectures, tutorial cases, and minor case studies. Through these focused lectures, students will build a deeper understanding of the real-world clinical manifestations and management strategies for the animal health issues they have been exploring. By integrating this clinical perspective with the theoretical knowledge and case-based learning, students will develop a more comprehensive and practical understanding of veterinary medicine. The lecture series will complement the other teaching and learning activities, allowing students to synthesize the information and apply their knowledge to the clinical context. This holistic approach will better prepare students for the challenges they may face in their future veterinary practice. | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 | 3 hrs/wk |

| 7 | Study Tips | Students will have the opportunity to attend Optional Lectures that provide guidance on organizing, managing, and integrating the information they are learning throughout the course. These optional lectures will offer students strategies and techniques to effectively manage the large volume of material covered in the curriculum. Students will learn how to organize their notes, study efficiently, and synthesize the interconnected concepts across different course components, such as lectures, tutorial cases, and minor case studies. By attending these optional sessions, students will develop essential skills for academic success and lifelong learning. The guidance provided will empower students to take a more active and self-directed approach to their studies, enabling them to better navigate the challenges of the veterinary program and prepare for their future professional roles. | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 | 1 hr/wk (Optional) |

**Assessment Tasks / Activities (ATs)**

|  | ATs | CILO No. | Weighting (%) | Remarks (e.g. Parameter for GenAI use) |
|---|---|---|---|---|
| 1 | Weekly Quizzes | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 | 16 | |
| 2 | PBL participation | 1, 2, 6, 12, 13 | 10 | |
| 3 | Midterm | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 | 28 | |
| 4 | Laboratory class reports | 2, 8, 9 | 4 | |

**Continuous Assessment (%)**

58

**Examination (%)**

42

**Examination Duration (Hours)**

6

**Additional Information for ATs**

A penalty of 5% of the total marks for the assessment task will be deducted per day for late submissions, and no marks will be awarded for submissions more than 10 days later.

**Assessment Rubrics (AR)**

**Assessment Task**

1. Quizzes

**Criterion**

Ability to explain the immunology, epidemiology, bacteriology, virology, parasitology, clinical pathology, systemic pathology, laboratory medicine and clinical pharmacology applicable to various veterinary medical conditions and disease outbreaks.

**Excellent (A+, A, A-)**

Excellent in understanding, explaining, exploring and integrating the knowledge

**Good (B+, B, B-)**

Good in understanding, explaining, exploring and integrating the knowledge

**Fair (C+, C, C-)**

Basic competence in understanding, explaining, exploring and integrating the knowledge

**Failure (F)**

Poor in understanding, explaining, exploring and integrating the knowledge

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**Assessment Task**

2. Laboratory class reports

**Criterion**

Ability to explain the immunology, epidemiology, bacteriology, virology, parasitology, clinical pathology, systemic pathology, laboratory medicine and clinical pharmacology applicable to various veterinary medical conditions and disease outbreaks following each laboratory class.

**Excellent (A+, A, A-)**

Excellent in understanding, explaining, exploring and integrating the knowledge

**Good (B+, B, B-)**

Good in understanding, explaining, exploring and integrating the knowledge

**Fair (C+, C, C-)**

Basic competence in understanding, explaining, exploring and integrating the knowledge

**Failure (F)**

Poor in understanding, explaining, exploring and integrating the knowledge

**Assessment Task**

3. Mid-term and Final Exam

**Criterion**

Ability to explain the immunology, epidemiology, bacteriology, virology, parasitology, clinical pathology, systemic pathology, laboratory medicine and clinical pharmacology applicable to various veterinary medical conditions and disease outbreaks.

**Excellent (A+, A, A-)**

Excellent in understanding, explaining, and integrating the knowledge in written format

**Good (B+, B, B-)**

Good in understanding, explaining, and integrating the knowledge in written format

**Fair (C+, C, C-)**

Basic competence in understanding, explaining, and integrating the knowledge in written format

**Failure (F)**

Poor in understanding, explaining, and integrating the knowledge in written format

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**Assessment Task**

4. PBL Participation, Assessment*

**Criterion**

Ability to work well in a team environment, with a commitment to participation in group work. Demonstration of effective self-management of learning.

**Excellent (A+, A, A-)**

Fully engaged with the team, assisting others and requesting assistance. Completes all out-of-class tasks. Always punctual.

**Good (B+, B, B-)**

Usually engaged with the team, assisting others and requesting assistance. Usually completes out-of-class tasks. Usually punctual.

**Fair (C+, C, C-)**

Sometimes engaged with the team, assisting others and requesting assistance. Sometimes completes out-of-class tasks. Sometimes punctual.

**Failure (F)**

Rarely or never engaged with the team, assisting others or requesting assistance. Rarely or never completes out-of-class tasks. Rarely or never punctual. Abusive, disruptive or offensive behaviour, bullying.

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**Additional Information for AR**

**Mark Range**

The following is the mark range for each letter grade that must be used for assessment of courses offered by the PH and VCS Department of JCC (including Gateway Education (GE) courses)

| Letter Grade | Mark Range | Letter Grade | Mark Range |
|---|---|---|---|
| A+ | ≥92% | C+ | 54-60.99% |
| A | 87-91.99% | C | 50-53.99% |
| A- | 82-86.99% | F | <50% |
| B+ | 75-81.99% | | |

B                          68-74.99%
B-                         61-67.99%

**\* The Participation Assessment is a 'must pass' component; a failing grade at the Participation Assessment will lead to an overall F grade for the entire course**

# Part III Other Information

### Keyword Syllabus

Immunology, epidemiology, virology, bacteriology, mycology, pathology, clinical pathology, laboratory medicine, clinical pharmacology, disease outbreaks, diagnostic investigation, laboratory medicine.

### Reading List

### Compulsory Readings

|   | Title |
|---|-------|
| 1 | Bowman, D. (2013). Georgis' Parasitology for Veterinarians. 10th ed. St. Louis, MO:Saunders. |
| 2 | Parham, P. (2013). The Immune System, 3rd ed. Garland Science. |
| 3 | McVey, D.S. et al. (2013). Veterinary Microbiology. 3rd ed, Wiley-Blackwell. |
| 4 | Tizard I. R. (2012). Veterinary Immunology: An Introduction 9th ed. Elsevier. |
| 5 | Owen, J.A. et al. (2013). Kuby Immunology. 7'h ed. W. H. Freeman. |
| 6 | Greene C.E. (2011). Infectious Diseases of the Dog and Cat. 4th ed, Elsevier. |
| 7 | Smith B.P. (2014). Large Animal Internal Medicine. 5th ed. Elsevier. |
| 8 | Ettinger S.J. and Feldman, E.C. (2010). Textbook of Veterinary Internal Medicine: Diseases ofthe Dog and Cat. 7th ed. Saunders Elsevier. |

### Additional Readings

|   | Title |
|---|-------|
| 1 | Acha, P. N. and Szyfres, B (1987). Zoonotic and Communicable Diseases Common to Manand Animals. PAHO. |
| 2 | Radostits, O. M. et al. (2007). Veterinary Medicine: a Textbook of the Diseases of Cattle.Sheep, Pigs and Horses, 10th ed. Saunders. |
| 3 | Dawson, B. and Trapp, R. G. (2004). Basic and Clinical Biostatistics, 4th ed. Lange. |
| 4 | Fletcher, R. H. et al. (2012). Clinical Epidemiology: The Essentials, 5th ed. LippincottWilliams & Wilkins. |
| 5 | Gyles, C. J., et al. (2010). Pathogenesis of Bacterial Infections in Animals, 4th ed.Wiley-Blackwell. |
| 6 | Markey, B. et al. (2013). Clinical Veterinary Microbiology, 2nd ed. Mosby. |