VM3100: FUNCTION AND DYSFUNCTION

Effective Term
Semester A 2024/25

Part I Course Overview

Course Title
Function and Dysfunction

Subject Code
VM - Jockey Club College of Veterinary Medicine and Life Sciences
Course Number
3100

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 2 courses with C grade or above

Precursors
Nil

Equivalent Courses
Nil

Exclusive Courses
Nil

Part II Course Details

Abstract
The course 'Function and Dysfunction' integrates the disciplines of physiology, pathophysiology, pharmacology, anatomical pathology (gross and microscopic), and clinical pathology. These disciplines provide a bridge between the basic sciences

and clinical medicine. Broadly, the overall goal of this course is that: 'Students will gain a competent understanding of the integrated function and dysfunction of body systems from the molecular/cellular level to the whole organism. Within this context, students will appreciate the fundamental basis of relevant diagnostic techniques and appropriate therapeutic strategies.' The animal body comprises a large set of highly complex, but integrated, biological systems that operate over a wide range of levels, from the molecular to the whole animal. These systems provide mechanisms for gathering information from and interacting with both the external and internal environment, maintaining stability of the internal environment, and repairing structures and mechanisms that have undergone injury. This course is designed to develop an understanding of how an animal maintains itself as a functional organism in the face of environmental challenges, disease entities, functional and structural disorders, and injuries of all sorts. Principles learned in the course General Pathology will find application within the context of specific tissues and organ systems. This course is concerned with understanding how body systems work, how they are controlled and regulated, how veterinarians assess their function, what can go wrong with them, how they undergo repair, and how the veterinarian can aid the repair process. The various disciplines that contribute to this course are organised into the following sections: Nervous System and General Pharmacology, Skeletal Muscle, Blood, Urinary System, Cardiovascular System, Respiratory System, Gastrointestinal Tract, Liver, Pancreas, Endocrine System, Reproductive System, and Ruminants. Each section of the course will address the relevant physiology, pathology, and pharmacology of the system of interest using a problem-based approach.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Demonstrate a competent understanding of the integrated function and dysfunction of body systems from the molecular/cellular level to the whole organism in common domestic mammalian and avian species. Explain on a whole animal level what “services” each system provides, and the clinical signs that are commonly associated with dysfunction of specific body systems.		x	x	x
2	For each body system, explain the mechanisms that drive the function of each organ and tissue, the control mechanisms that regulate its functions, the factors (internal and external) that can perturb the control mechanisms, the consequences of loss of control, how the function of the system is inter-related to the function of other systems, and how the system’s organs handle both exogenous and endogenous compounds.		x	x	x

3	For each body system, explain the mechanisms of injury and repair on an organ, tissue, cell, and subcellular level, particularly focusing on: · The various ways in which the body system undergoes injury, · The lesions commonly encountered and the aetiology and pathogenesis of each, · How tissues in this organ respond to injury, · How uninjured cells respond in the presence of injured cells, · How the function of the organ is affected by injury to its cells, · How other systems are affected by cellular injury of this organ, · The clinical consequences of injury to the organ system, · How cellular injury and subsequent organ dysfunction is detected clinically, · What the prognosis for the organ and body function is, given a specific injury to this system.		x	x	x
4	Explain what subcellular functions of the cells in a body system are subject to modulation by exogenous and endogenous factors (drugs, toxins, neurotransmitters, hormones, etc.), and how systemic function is affected by modulation of subcellular functions. Explain how these factors enhance or impede the access of pharmacologic agents to the cells in this system, and apply the concepts of pharmacokinetics and pharmacodynamics to drug action.		x	x	x
5	Demonstrate competent clinical reasoning skills by: · Creating diagnostically and therapeutically useful problem lists, · Generating multiple pathophysiological hypotheses to explain diseases and disorders, · Proposing diagnostic tests to distinguish among proposed hypotheses.		x	x	x
6	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	Problem-based learning (PBL) tutorials #	Students will practice the application of basic medical science that underlies and explains the development, presence, and treatment of clinical signs. Students will engage in an active learning environment in small groups, focusing on body systems and explaining the physiology, pathology, and pharmacology using a problem-based approach.	1, 2, 3, 4, 5, 6	7 hrs/wk
2	Lectures	Complementing the PBL core of the course, students will also engage in didactic lectures addressing the physiology, pathology, and pharmacology of body systems on selected topics. Students will explore topics that are not sufficiently addressed by the small-group activities, but are essential components of the veterinarian’ s database of knowledge.	1, 2, 3, 4, 5	7 hrs/wk
3	Laboratory practicals #	Students will actively participate in hands-on laboratory sessions, and gain a deeper understanding of physiology, pathology, and pharmacology, using wet lab and computer-aided exercises.	1, 2, 3, 4, 5, 6	2 hrs/wk

4	Clinical Rounds	Students will analyse clinical cases, present the history and clinical signs, and use these to explain the underlying physiological, pathological and pharmacological mechanisms. In this interactive format, students will test, practice, and sharpen clinical reasoning skills and knowledge acquired via other teaching modalities as part of their development of clinical expertise.	1, 2, 3, 4, 5	2 hr/wk

Additional Information for LTAs

[#] These are participation and engagement-required TLA sessions. Students can be absent from no more than one of these sessions per course per semester. Additional absence will constitute a course failure. Students are responsible for arriving to course TLAs on time; late arrival may be considered as absence.

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Participation Assessment (PBL tutorials)	1, 2, 3, 4, 5, 6	10	
2	Individual Quizzes	1, 2, 3, 4, 5	15	
3	Mid-term exam	1, 2, 3, 4, 5	25	

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

90 min x 3

Assessment Rubrics (AR)

Assessment Task

1. Participation Assessment

Criterion

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

Excellent (A+, A, A-)

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

Good (B+, B, B-)

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

Fair (C+, C, C-)

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

Failure (F)

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

Assessment Task

2. Individual Quizzes

Criterion

Ability to explain the pathology, physiology, and pharmacology underlying health and disease in various veterinary medical conditions.

Excellent (A+, A, A-)

Excellent in explaining, discussing and integrating the knowledge

Good (B+, B, B-)

Good in explaining, discussing and integrating the knowledge

Fair (C+, C, C-)

Basic competence in explaining, discussing and integrating the knowledge

Failure (F)

Poor in explaining, discussing and integrating the knowledge

Assessment Task

3. Mid-term exam

Criterion

Ability to explain the pathology, physiology, and pharmacology underlying health and disease in various veterinary medical conditions.

Excellent (A+, A, A-)

Excellent in explaining, discussing and integrating the knowledge

Good (B+, B, B-)

Good in explaining, discussing and integrating the knowledge

Fair (C+, C, C-)

Basic competence in explaining, discussing and integrating the knowledge

Failure (F)

Poor in explaining, discussing and integrating the knowledge

Assessment Task

4. Final exam

Criterion

Ability to explain the pathology, physiology, and pharmacology underlying health and disease in various veterinary medical conditions

Excellent (A+, A, A-)

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

Good (B+, B, B-)

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

Fair (C+, C, C-)

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

Failure (F)

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

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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 any examinations or coursework of BVM courses (VM- and GE-coded) offered by PH and VCS.

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%		

Students can be absent from no more than one participation and engagement-required TLA session per course per semester. Additional absence(s) from these session(s) constitute a course failure.

Part III Other Information

Keyword Syllabus

Physiology, Pathophysiology, Pharmacology, Anatomical Pathology, Gross Pathology, Microscopic Pathology, Clinical Pathology, Nervous System, Skeletal Muscle, Blood, Urinary System, Cardiovascular System, Respiratory System, Gastrointestinal Tract, Liver, Pancreas, Endocrine System, Reproductive System, Ruminants, Problem-Based Learning, Clinical Reasoning Skills.

Reading List

Compulsory Readings

	Title
1	Costanzo, L.S. (2018). Physiology, 6th ed. Philadelphia: Saunders.
2	Reece, W.O., Erickson, H.H., Goff, J.P., Uemura, E.E., ed. (2015) Dukes' Physiology of the Domestic Animals. 13th ed. Ames, IA: Wiley.
3	Zachary JF, eds. (2017). Pathologic Basis of Veterinary Disease. 6th ed. St. Louis, MO: Elsevier; Elsevier Health Sciences.
4	eClinPath.com, Cornell University

5	Rang H, Ritter J, Flower R, Henderson G (2016). Rang & Dale's Pharmacology 8th ed. London: Elsevier Churchill Livingstone.

Additional Readings

	Title
1	Boron, W. F. and E. L. Boulpaep. (2016) Medical Physiology: A Cellular and Molecular Approach. 3rd ed. Philadelphia: Saunders.
2	Ettinger, S.J., Feldman, E.C., and Cote, E. (2017) Textbook of Veterinary Internal Medicine. 8th ed. Philadelphia: Elsevier.
3	Senger, P.L. (2012). Pathways to pregnancy and parturition 3rd ed., Pullman, WA: Current Conceptions.
4	Stockham, S. L. and Scott, M.A. (2008) Fundamentals of Veterinary Clinical Pathology. 2nd ed. Ames, IA: Iowa State Press
5	Hsu, W.H., ed. (2008) Handbook of Veterinary Pharmacology. Wiley-Blackwell