

**City University of Hong Kong**  
**Course Syllabus**

**offered by Department of Infectious Diseases and Public Health**  
**with effect from Semester A 2017/18**

---

**Part I Course Overview**

**Course Title:** Aquatic Veterinary Medicine II (Invertebrates)

**Course Code:** VM 4202

**Course Duration:** 1 semester

**Credit Units:** 3 credits

**Level:** B4

**Proposed Area:**  Arts and Humanities  
(for GE courses only)  Study of Societies, Social and Business Organisations  
 Science and Technology

**Medium of Instruction:** English

**Medium of Assessment:** English

**Prerequisites:** Completion of Year 4 courses with C grade or above  
(Course Code and Title)

**Precursors:** Nil  
(Course Code and Title)

**Equivalent Courses:** Nil  
(Course Code and Title)

**Exclusive Courses:** Nil  
(Course Code and Title)

## Part II Course Details

### 1. Abstract

(A 150-word description about the course)

This initial Foundation topic consists of two parts; the Biology and Physiology of aquatic invertebrates (e.g. crustaceans and mollusks), followed by consideration of Diseases and Strategies to Maintain Health. Our overall objective is to present students with ideas about form, function, malfunction and aspects of husbandry and welfare which relate specifically to Aquaculture. The emphasis is placed on satisfying physiological and biological requirements in aquaculture, understanding energy flow and optimising culture conditions. The main viral, parasitic and fungal diseases of invertebrates and clinical examination and diagnosis, together with therapeutics, are reviewed. Practical sampling sessions and case studies provide the opportunity to gain some hands on experience. This topic will be a useful starting point for those wishing to gain broad knowledge of the main components of aquatic animal biology and health. Completion of topic will help students to understand legislation, regulations, and policies, as well as to address current issues of aquatic animal welfare.

### 2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs <sup>#</sup>	Weighting* (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	A2	A3
1.	Practical and theoretical understanding of aquatic invertebrates such as molluscan and crustacean physiology		✓		
2.	Understanding of culture requirements of aquatic invertebrates		✓		
3.	Knowledge of anaesthesia and sedation techniques of aquatic invertebrates		✓		
4.	Theoretical and practical knowledge of diseases and causative factors associated with aquatic invertebrates		✓	✓	
5.	Ability to develop differential diagnoses of aquatic invertebrates diseases and adequately report clinical and non-clinical factors to reach a reasoned outcome		✓	✓	
6.	Good understanding of the laws, regulations and policies that directly impact the practice of aquatic veterinary medicine in areas relevant to the candidate		✓	✓	✓
7.	Knowledge of current issues related to aquatic animal welfare and an ability to assess the welfare status of key aquatic species		✓	✓	✓

\* If weighting is assigned to CILOs, they should add up to 100%.

100%

<sup>#</sup> Please specify the alignment of CILOs to the Gateway Education Programme Intended Learning outcomes (PILOs) in Section A of Annex.

#### 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.

#### 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 self-life problems.*

*Accomplishments*

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

### 3. Teaching and Learning Activities (TLAs)

(TLAs designed to facilitate students' achievement of the CILOs.)

TLA	Brief Description	CILO No.							Hours/week (if applicable)
		1	2	3	4	5	6	7	
Lectures	Lectures will provide fundamental concepts and principles of aquatic animals (e.g. crustaceans and mollusks) Biology & Health to students	✓	✓	✓	✓	✓	✓	✓	2 hr/wk
Tutorial	Group discussion will be used to facilitate conceptual understanding	✓	✓	✓	✓	✓	✓	✓	1 hr/wk
Laboratory-based practical sessions	The laboratory practical sessions provide students with opportunities to understand, perform and report different testing for diseases associated with aquatic invertebrates	✓			✓	✓	✓	✓	4 hours every fourth week

### 4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.							Weighting*	Remarks
	1	2	3	4	5	6	7		
Continuous Assessment: <u>50%</u>									
Short tests	✓	✓	✓	✓	✓	✓	✓	20%	
Essays	✓	✓	✓	✓	✓	✓	✓	30%	
Examination: <u>50%</u> (duration: 2 hours)									
								100%	

\* The weightings should add up to 100%.

## 5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C)	Failure (F)
1. Short tests	Students should be able to demonstrate fundamental understanding of the principles related to various aspects of Biology & Health of Aquatic Invertebrates.	Students complete all tests and can demonstrate excellent synthesis of the principles, processes, methodologies, problems and limitations related to various aspects of Biology & Health of Aquatic Invertebrates in detail.	Students complete all tests and can describe and explain principles, processes, methodologies, problems and limitations related to various aspects of Biology & Health of Aquatic Invertebrates with a high degree of accuracy and thoroughness.	Students complete all tests and can describe and explain some key principles, processes and methodologies related to various aspects of Biology & Health of Aquatic Invertebrates.	Students fail to complete all tests and/or cannot accurately describe and explain relevant principles, processes, methodologies, problems and limitations related to various aspects of Biology & Health of Aquatic Invertebrates.
2. Essays	Students should be able to review and evaluate literature and presentations critically, competently apply for appropriate techniques, and draft a scientifically justified research proposal/project.	Students complete the essays and can demonstrate excellent synthesis of the principles, processes, methodologies, problems and limitations related to various aspects of Biology & Health of Aquatic Invertebrates in detail. Capable of providing a comprehensive analysis of the aquatic invertebrate disease diagnosis with clarity of explanations, logical and advanced justifications, and creative/personal interpretations and view-points. Demonstrate the ability to validate new aquatic invertebrate diseases with originality in thought, argument or application, with effective oral and written communication.	Students complete the essays and can describe and explain principles, processes, methodologies, problems and limitations related to various aspects of Biology & Health of Aquatic Invertebrates with a high degree of accuracy and thoroughness. Capable of providing a detailed, critical analysis of aquatic invertebrate disease diagnosis. Show ability in integration of concepts, analysis aquatic invertebrate diseases and applications via clear oral and written	Students complete the essays and can describe and explain some key principles, processes and methodologies related to various aspects of Biology & Health of Aquatic Invertebrates. Provides simple but accurate explanations and basic justifications for the diagnosis of aquatic invertebrate diseases. Shows evidence of use of oral and written communication clearly.	Students fail to complete the essays and/or cannot accurately describe and explain relevant principles, processes, methodologies, problems and limitations related to various aspects of Biology & Health of Aquatic Invertebrates. Cannot provide appropriate analysis and satisfactory justifications to the diagnosis of aquatic invertebrate diseases, and may show evidence of plagiarism or inability to communicate ideas.

			communication.		
3. Examination	Students should have obtained an understanding of the scientific method at a level adequate to provide a rational basis of understanding of Biology & Health of Aquatic Invertebrates, and to assimilate the advances in knowledge which will occur over their working life.	Students complete the essays and can demonstrate excellent synthesis of the principles, processes, methodologies, problems and limitations related to various aspects of Biology & Health of Aquatic Invertebrates in detail. Capable of providing a comprehensive analysis of the aquatic invertebrate disease diagnosis with clarity of explanations, logical and advanced justifications, and creative/personal interpretations and view-points. Demonstrate the ability to validate new aquatic invertebrate diseases with originality in thought, argument or application, with effective oral and written communication.	Students complete the essays and can describe and explain principles, processes, methodologies, problems and limitations related to various aspects of Biology & Health of Aquatic Invertebrates with a high degree of accuracy and thoroughness. Capable of providing a detailed, critical analysis of aquatic invertebrate diseases. Show ability in integration of concepts, analysis aquatic invertebrate diseases and applications via clear oral and written communication.	Students complete the essays and can describe and explain some key principles, processes and methodologies related to various aspects of Biology & Health of Aquatic Invertebrates. Provides simple but accurate explanations and basic justifications for the diagnosis of aquatic invertebrate diseases. Shows evidence of use of oral and written communication clearly.	Students fail to complete the essays and/or cannot accurately describe and explain relevant principles, processes, methodologies, problems and limitations related to various aspects of Biology & Health of Aquatic Invertebrates. Cannot provide appropriate analysis and satisfactory justifications to the diagnosis of aquatic invertebrate diseases, and may show evidence of cheating.

### Part III Other Information (more details can be provided separately in the teaching plan)

#### 1. Keyword Syllabus

(An indication of the key topics of the course.)

Local and other aquatic invertebrates of global significance e.g. shrimp, clams, oysters, etc

#### 2. Reading List

##### 2.1 Compulsory Readings

(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

1.	Ronald J. Roberts (2012). <i>Aquatic invertebrate Pathology, 4th Edition</i> . Wiley-Blackwell.
2.	Ross, L. G. and Ross, B. (eds) (2008). <i>Anaesthesia of Aquatic Invertebrates, in Anaesthetic and Sedative Techniques for Aquatic Animals, Third Edition</i> . Blackwell Publishing Ltd., Oxford, UK.
3.	Lewbart, G. A. (2011). <i>Invertebrate Medicine, 2nd Edition</i> . John Wiley & Sons.

##### 2.2 Additional Readings

(Additional references for students to learn to expand their knowledge about the subject.)

1.	Patrick T. K. Woo, Kurt Buchmann (2001). <i>Aquatic invertebrate Parasites: Pathobiology and Protection</i> . CABI.
2.	Leland S. Shapiro and Patricia Mandel (2010). <i>Pathology and Parasitology for Veterinary Technicians, 2nd ed.</i>
3.	Noga. <i>Aquatic invertebrate Disease: Diagnosis and Treatment, 2nd ed</i> , Wiley-Blackwell.
4.	Ruppert, Edward E. and Robert D. Barnes. <i>Invertebrate Zoology, Sixth Edition</i> . Saunders College Publishing.
5.	Treves-Brown, K. M. (2000). <i>Applied aquatic invertebrate pharmacology</i> . Dordrecht: Kluwer Academic.
6.	Hugh W. Ferguson (2006). <i>Biology &amp; Health of Aquatic Invertebrates of Aquatic invertebrate: A Text and Atlas of Normal Tissues in Teleosts and Their Responses in Disease, 2nd Edition</i> . Scotian Press.
7.	Jenkins, R. L., & Halusky, J. G. (1980). Aquatic animal medicine: A state of the art: Proceedings of a conference held April 25, 1979 at Whitney Hall, Marineland, Florida. Gainesville, FL: Marine Advisory Program.
8.	Ross, L. G., Ross, B., & Ross, L. G. (1999). <i>Anaesthetic and sedative techniques for aquatic animals</i> . Oxford: Blackwell Science.