

# VM4112: ANAESTHESIA, ANALGESIA AND FLUID THERAPY

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## Effective Term

Semester B 2023/24

## Part I Course Overview

### Course Title

Anaesthesia, Analgesia and Fluid Therapy

### Subject Code

VM - Jockey Club College of Veterinary Medicine and Life Sciences

### Course Number

4112

### Academic Unit

Veterinary Clinical Sciences (VCS)

### College/School

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

### Course Duration

One Semester

### Credit Units

4

### 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 builds on the foundation of the modules 'Animal Body' 'Function and Dysfunction' and 'Clinical Pharmacology/ Toxicology' and applies basic knowledge on physiology and pharmacology to the clinical areas of anaesthesia, pain management and fluid therapy. This course provides a sound foundation for clinical rotations in later parts of the programme. A variety of pedagogical techniques are used, including lectures, demonstrations, cadaver and mannequin models, live animal practical, dry lab exercises and case discussions.

Anaesthesia is covered primarily using a sequential approach to performing an anaesthetic procedure, with a focus on drug protocols and choices, patient welfare and safety. Clinical reasoning skills are developed as more complex cases and situations as well as species differences between cats and dogs but also an overview of particularities of anaesthesia regarding horses and farm animals. Clinical skills are developed within a range of laboratory sessions. One of the practical elements, performing anaesthesia of a cat for ovariohysterectomy, will allow students to consolidate their knowledge, understanding, and clinical skills up to this point in the programme.

Pain management is approached from a clinical view point to ensure students are equipped with skills to recognise and treat pain appropriately in a range of situations. Local anaesthetic techniques are both discussed and explored practically with cadavers to ensure students have a best-practice and evidenced based approach to multimodal analgesia. The use of objective and subjective pain assessment tools in a range of species ensure students are prepared to utilise a team-based approach to pain management.

This course further develops the student's awareness and skills for providing fluid therapy as part of a treatment plan in a range of clinical cases. Relevant physiology and pathophysiology are discussed and treatment options introduced with emphasis on the fluid therapy plan. Lectures will be supported with laboratory sessions to develop clinical skills.

#### Course Intended Learning Outcomes (CILOs)

CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1 Integrate knowledge of anatomy, physiology pharmacology and coexisting diseases to perform a pre-anaesthetic investigation, identify any required diagnostic interventions, formulate an anaesthetic plan and discuss and demonstrate its implementation and monitoring with a team-based approach.		x	x	x
2 Describe the mechanisms of action, dosage and clinical use of anaesthetic and analgesic drugs to ensure patient welfare and safety in the peri-anaesthetic period and discuss options to deal with complications that may arise.		x	x	x
3 Discuss and demonstrate correct use of anaesthetic equipment including maintenance, testing, safety checklists, record keeping and troubleshooting common equipment malfunctions.		x		
4 Compare and contrast species-specific anaesthesia considerations based on their pharmacological responses, anatomy, physiology and behaviour.		x		
5 Apply an understanding of the mechanisms of action of analgesics and formulate analgesia plans in different settings; administer analgesia via a range of techniques including loco-regional blocks, and describe assessment and evaluation of analgesic plans with a team-based approach.		x	x	x

6	Identify fluid, electrolyte, and acid-base disturbances from clinical and laboratory findings and understanding of their underlying pathophysiological mechanisms. Plan, execute and monitor a suitable fluid therapy plan.		x	x	x
7	Describe when and how to perform euthanasia considering the use of quality of life assessment tools, euthanasia consent forms and pet owner resources for coping with the loss of a pet.		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.

**Teaching and Learning Activities (TLAs)**

TLAs	Brief Description	CILO No.	Hours/week (if applicable)	
1	Lectures	Lectures will provide essential facts	1, 2, 3, 4, 5, 6, 7	31 hours in total
2	Clinical Skills Laboratories*	The CSL provide opportunities to understand, and perform skills with immediate feedback	2, 3, 6	9 hours in total
3	Practical*	Anaesthesia of a cat undergoing ovariohysterectomy	1, 2, 3, 5	6 hours in total
4	Case discussion	Clinical case-based discussion to integrate principles of anaesthesia, pain management and fluid therapy	1, 2, 4, 5, 6	6 hours in total

**Additional Information for TLAs**

\*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.

**Assessment Tasks / Activities (ATs)**

ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)	
1	Quizzes*	1, 2, 3, 4, 5, 6, 7	30	There will be two quizzes of 15 questions each.
2	Practicals	3, 6	20	

3	Written Examination (2 hrs)**	1, 2, 3, 4, 5, 6, 7		Weighting: 50%
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**Continuous Assessment (%)**

50

**Examination (%)**

50

**Examination Duration (Hours)**

2

**Additional Information for ATs**

# Students will pass the course if they reach an overall 50% mark or more.

\*For quizzes I and II, there will be 15 multiple-choice quizzes with one single answer each to choose from A, B, C, or D (1 point each). Please bring your own laptop and charger for the examination as this is an electronic-based examination using Canvas and LockDown Browser is required. Late students will not be allowed in the room. Questions will be taken from each respective "block" of lectures given before each quiz (and not cumulative).

Each assessment corresponds to 1/2 out of the 30% of your assessment tasks/activities (ATs) related to "quizzes". You will have 20 minutes to complete this assessment. Mobile phones, books, articles, calculators, or gadgets are not allowed. Please note that, as this assessment is equivalent to only 15% of the total grade, there will not be replacements if you miss it.

\*\*Please find below the information about the final written examination.

Format: There will be 49 multiple choice questions with one correct answer each (1 point each) and three distractors plus a short answer question (1 point). The exam corresponds to 50% of the total grade for course VM4112.

Content: The exam will include questions from the entire course with an emphasis on clinical reasoning (cases), principles, and concepts related to anaesthesia and pain management.

Where and how: Please login to Canvas with your own laptop (you are responsible for making sure the device is in good working condition and a charger is available accordingly). The lockdown browser is required. You must sit in the allocated rows in the classroom as instructed before examination. Please refer the examination timetable on AIMS for the examination venue.

**Other reminders:**

According to the Staff Guidelines for the Preparation of Final Examinations Online by City University of Hong Kong, some gentle reminders are provided:

- Bring your student ID card as a proof of identity
  - Late arrivals will not be allowed to take the exam
  - This will be a closed book examination
  - Mobile phones, books, articles, earphones, or ANY other gadgets are not allowed
  - You are not allowed to wear hoods during examination
  - Calculators are allowed but you CANNOT use them on your mobile phone; only CityU approved calculators are allowed
- o [https://www.cityu.edu.hk/arro/exam/exam\\_main.htm](https://www.cityu.edu.hk/arro/exam/exam_main.htm)
- o [https://www.cityu.edu.hk/arro/files/file/hk/exam/List%20of%20Approved%20Calculators\\_2021.pdf](https://www.cityu.edu.hk/arro/files/file/hk/exam/List%20of%20Approved%20Calculators_2021.pdf)
- Be reminded to manage your time carefully and to take responsibility for your examination environment
  - Please make sure to check your network connection. You must log out of Canvas before leaving the room.
  - You should arrive at least 15 minutes before the examination begins as per the BVM Assessment Policy

Honesty pledge:

The Staff Guidelines for the Preparation of Final Examinations Online by City University of Hong Kong requests students to accept and acknowledge the honesty pledge. By taking this upcoming exam, you reaffirm the honesty pledge below and understand that violations may lead to penalties.

"I pledge that the answers in this examination are my own and that I will not seek or obtain an unfair advantage in producing these answers. Specifically,

- ❖ I will not use or attempt to use any unauthorized materials, or any study aids including course material in any form;
- ❖ I will not plagiarize from any source;
- ❖ I will not communicate or attempt to communicate with any other person during the examination;
- ❖ Neither will I give or attempt to give assistance to another student taking the examination; and
- ❖ I will use only explicitly approved electronic device(s) to complete this examination.

I understand that any act of academic dishonesty can lead to disciplinary action.

I pledge to follow the Rules on Academic Honesty and understand that violations may lead to severe penalties."

### **Assessment Rubrics (AR)**

#### **Assessment Task**

Quizzes, Practical Formative and Summative Assessments, and Examinations

#### **Criterion**

Integrate pre-clinical knowledge to perform a pre-anaesthetic investigation, identify any required diagnostic interventions, formulate an anaesthetic plan and discuss and demonstrate its implementation and monitoring with a team-based approach

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

Excellent integration of pre-clinical knowledge to formulate an anaesthetic plan for a patient considering the results of pre-anaesthetic investigation and patient's health

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

Good integration of pre-clinical knowledge to formulate an anaesthetic plan for a patient considering the results of pre-anaesthetic investigation and patient's health

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

Basic integration with some flaws of pre-clinical knowledge to formulate an anaesthetic plan for a patient considering the results of pre-anaesthetic investigation and patient's health

#### **Failure (F)**

Weak integration of pre-clinical knowledge to formulate an anaesthetic plan for a patient considering the results of pre-anaesthetic investigation and patient's health

#### **Assessment Task**

Quizzes, Practical Formative and Summative Assessments, and Examinations

#### **Criterion**

Describe the mechanisms of action, dosage and clinical use of anaesthetic and analgesic drugs to ensure patient welfare and safety in the peri-anaesthetic period and discuss options to deal with complications that may arise.

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

Excellent recall of mechanisms of action, dosage and clinical use of anaesthetic and analgesic drugs to ensure patient welfare and safety in the peri-anaesthetic period. Recognises all major relevant complications with drug administration and patient's health

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

Good recall of the action, dosage and clinical use of anaesthetic and analgesic drugs to ensure patient welfare and safety in the peri-anaesthetic period. Recognises most major relevant complications with drug administration and patient's health

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

Basic recall of the action, dosage and clinical use of anaesthetic and analgesic drugs to ensure patient welfare and safety in the peri-anaesthetic period. Recognises some major relevant complications with drug administration and patient's health

**Failure (F)**

Weak recall of the action, dosage and clinical use of anaesthetic and analgesic drugs. Not able to select the most suitable agents to ensure patient welfare and safety in the peri-anaesthetic period. Does not recognise the major relevant complications with drug administration and patient's health

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**Assessment Task**

Quizzes, Practical Formative and Summative Assessments, and Examinations

**Criterion**

Discuss and demonstrate correct use of anaesthetic equipment including maintenance, testing, safety checklists, record keeping and troubleshooting common equipment malfunctions

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

Is able to discuss and demonstrate correct use of anaesthetic equipment. Has an excellent knowledge of maintenance, testing, safety checklists, record keeping and ability to troubleshoot common equipment malfunctions

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

Is able to discuss and demonstrate correct use of anaesthetic equipment. Has a good knowledge of maintenance, testing, safety checklists, record keeping and ability to troubleshoot common equipment malfunctions

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

Is able to discuss and demonstrate correct use of anaesthetic equipment. Has a basic knowledge of maintenance, testing, safety checklists, record keeping skills and ability to troubleshoot common equipment malfunctions

**Failure (F)**

Is not able to discuss and demonstrate correct use of anaesthetic equipment. Has an inadequate knowledge of maintenance, testing, safety checklists. Has inadequate record keeping skills and is unable to troubleshoot common equipment malfunctions

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**Assessment Task**

Quizzes, Practical Formative and Summative Assessments, and Examinations

**Criterion**

Compare and contrast species-specific anaesthesia considerations based on their pharmacological responses, anatomy, physiology and behaviour

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

Is able to compare and contrast species-specific anaesthesia considerations. Has excellent knowledge and understanding of pharmacological responses, anatomy, physiology and behaviour

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

Is able to compare and contrast species-specific anaesthesia considerations. Has good knowledge and understanding of pharmacological responses, anatomy, physiology and behaviour

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

Is able to compare and contrast species-specific anaesthesia considerations with some flaws in knowledge and understanding of pharmacological responses, anatomy, physiology and behaviour

### **Failure (F)**

Is not able to compare and contrast species-specific anaesthesia considerations due to weak or inadequate knowledge and understanding of pharmacological responses, anatomy, physiology and behaviour

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### **Assessment Task**

Quizzes, Practical Formative and Summative Assessments, and Examinations

### **Criterion**

Apply an understanding of the mechanisms of action of analgesics and formulate analgesia plans in different settings; administer analgesia via a range of techniques including loco-regional blocks, and describe assessment and evaluation of analgesic plans with a team-based approach.

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

Has an excellent understanding of the mechanisms of action that underly pain and analgesia and the ability to make the most appropriate clinical and welfare decisions to formulate analgesia plans in veterinary patients in different settings including routine surgical procedures, trauma and disease. Has excellent knowledge and understanding of provision of analgesia via a range of techniques, and can discuss monitoring and evaluation of analgesic plans with a team-based approach.

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

Has a good understanding of the mechanisms of action that underly pain and analgesia and the ability to make the most appropriate clinical and welfare decisions to formulate analgesia plans in veterinary patients in different settings including routine surgical procedures, trauma and disease. Has good knowledge and understanding of provision of analgesia via a range of techniques, and can discuss monitoring and evaluation of analgesic plans with a team-based approach.

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

Has a basic understanding of the mechanisms of action that underly pain and analgesia and the ability to make the most appropriate clinical and welfare decisions to formulate analgesia plans in veterinary patients in different settings including routine surgical procedures, trauma and disease. Has a basic knowledge and understanding of provision of analgesia via a range of techniques, and can discuss monitoring and evaluation of analgesic plans with a team-based approach.

### **Failure (F)**

Has inadequate understanding of the mechanisms of action that underly pain and analgesia and is not able make the most appropriate clinical and welfare decisions to formulate analgesia plans in veterinary patients in different settings including routine surgical procedures, trauma and disease. Has an inadequate knowledge and understanding of provision of analgesia via a range of techniques, and can discuss monitoring and evaluation of analgesic plans with a team-based approach.

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### **Assessment Task**

Quizzes, Practical Formative and Summative Assessments, and Examinations

### **Criterion**

Identify fluid, electrolyte, and acid-base disturbances from clinical and laboratory findings and understand their underlying pathophysiological mechanisms. Plan, execute and monitor a suitable fluid therapy plan

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

Demonstrates an excellent knowledge and understanding of fluid, electrolyte, and acid-base disturbances and their pathophysiological mechanisms and can plan, execute and monitor a suitable fluid therapy plan

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

Demonstrates a good knowledge and understanding of fluid, electrolyte, and acid-base disturbances and their pathophysiological mechanisms and can plan, execute and monitor a suitable fluid therapy plan

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

Demonstrates a basic knowledge and understanding of fluid, electrolyte, and acid-base disturbances and their pathophysiological mechanisms and can plan, execute and monitor a suitable fluid therapy plan

**Failure (F)**

Demonstrates an inadequate knowledge and understanding of fluid, electrolyte, and acid-base disturbances and their pathophysiological mechanisms and cannot plan, execute and monitor a suitable fluid therapy plan

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**Assessment Task**

Quizzes, Practical Formative and Summative Assessments, and Examinations

**Criterion**

Describe when and how to perform euthanasia considering the use of quality of life assessment tools, euthanasia consent forms and pet owner resources for coping with the loss of a pet.

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

Has an excellent understanding of when and how to perform euthanasia considering the use of quality of life assessment tools, euthanasia consent forms and pet owner resources for coping with the loss of a pet.

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

Has a good understanding of when and how to perform euthanasia considering the use of quality of life assessment tools, euthanasia consent forms and pet owner resources for coping with the loss of a pet.

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

Has a basic understanding of when and how to perform euthanasia considering the use of quality of life assessment tools, euthanasia consent forms and pet owner resources for coping with the loss of a pet.

**Failure (F)**

Has inadequate understanding of when and how to perform euthanasia considering the use of quality of life assessment tools, euthanasia consent forms and pet owner resources for coping with the loss of a pet.

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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.

A+: ≥85%

A: 80-84.99%

A-: 75-79.99%

B+: 70-74.99%

B: 65-69.99%

B-: 60-64.99%

C+: 55-59.99%

C: 50-54.99%

F:<50%

## Part III Other Information

**Keyword Syllabus**

Anaesthesiology

Anaesthetic Equipment

Anaesthesia Considerations

Anaesthetic Monitoring



Airway management  
 Clinical Record Keeping  
 Clinical Reasoning Skills  
 Fluid Disturbances  
 Electrolyte Disturbances  
 Acid-Base Disturbances  
 Fluid Therapy  
 Constant Rate Infusions  
 Pain Physiology  
 Analgesia  
 Pharmacology  
 Euthanasia

### Reading List

#### Compulsory Readings

Title	
1	Duke-Novakovski T. et al., 2016. BSAVA manual of canine and feline anaesthesia and analgesia Third., Quedgeley, Gloucester: British Small Animal Veterinary Association. 3rd edition
2	Gaynor, J.S. & Muir, W.W., 2009. Handbook of veterinary pain management 2nd ed., St. Louis, Mo.: Mosby/Elsevier.

#### Additional Readings

Title	
1	Dugdale A. et al.2020. Veterinary anaesthesia : principles to practice, Wiley-Blackwell .2nd edition
2	Steagall, P et al. Feline Anesthesia and Pain Management. Wiley-Blackwell. 1st edition.
3	Muir, WW et al. Equine Anesthesia: Monitoring and Emergency Therapy. 2nd edition
4	Di Bartola, S.P., 2011. Fluid, electrolyte, and acid-base disorders in small animal practice 4thed., St. Louis, Mo.: Saunders/Elsevier.
5	Johnson, R.A.J. et al. 2022. Canine and Feline Anesthesia and Co-existing Disease. 2nd ed., Wiley Blackwell