

VM4112: ANAESTHESIA, ANALGESIA AND FLUID THERAPY

Effective Term

Semester B 2025/26

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'. It applies basic knowledge on physiology and pharmacology to the clinical areas of anaesthesia, pain management and fluid therapy. This course provides a foundation for clinical rotations in later parts of the programme. Various pedagogical techniques are used including lectures, demonstrations, cadaver and mannequin models, live animal practicals, 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 using a case-based approach and clinical examples and scenarios. Species differences between cats and dogs but also an overview of particularities of anaesthesia regarding horses and farm animals are presented. 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 using a team-based approach.

Pain management is approached from a clinical perspective 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 evidence-based approach to multimodal analgesia. Objective and subjective pain assessment tools are taught in different species to ensure students are confident with pain recognition and diagnosis.

This course further develops the student's awareness and skills for providing fluid therapy as part of a treatment plan. Relevant physiology and pathophysiology are discussed and treatment options are introduced with an emphasis on the fluid therapy plan. Lectures are supported with laboratory sessions to develop clinical skills as well understanding of anesthetic monitoring and machine/equipment.

Course Intended Learning Outcomes (CILOs)

CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1 Formulate a safe and effective anaesthetic plan, considering any preexisting disease, and using a team-based approach.		x	x	x
2 Monitor anaesthesia with regard to patient welfare and safety in the peri-anaesthetic period and deal with any complications that may arise		x	x	x
3 Demonstrate correct use of anaesthetic equipment including maintenance, testing, safety checklists, record keeping and troubleshooting common equipment malfunctions.		x		
4 Demonstrate a clear understanding of species-specific anaesthesia considerations.		x		
5 Demonstrate safe and effective analgesia using a mechanism-based of analgesics and a range of techniques including loco- regional blocks, and describe analgesic plans with a team-based approach.		x	x	x
6 Correct fluid, electrolyte, and acid-base disturbances and implement and monitor a fluid therapy plan.		x	x	x
7 Describe 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.

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 anaesthesia and pain management	1, 2, 3, 4, 5, 6, 7	31 hours in total
2	Clinical Skills Laboratories*	Students will perform techniques and demonstrate skills with immediate feedback related to anaesthesia and pain management	2, 3, 6	9 hours in total
3	Practical*^	Students will anaesthetize a cat undergoing ovariohysterectomy within a team-based approach	1, 2, 3, 5	6 hours in total
4	Case discussion	Students will be participate in case discussions led by the professor, but also present a clinical case as a group to integrate principles of anaesthesia, pain management and fluid therapy; students may use AI tools to reflect, analyse and critically evaluate evidence-based information provided by chatbots.	1, 2, 4, 5, 6	6 hours in total

Additional Information for LTAs

*These are participation and engagement-required LTA 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 must complete anaesthesia of a cat undergoing ovariohysterectomy (i.e. cat spays) to successfully complete the course.

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Quizzes*	1, 2, 3, 4, 5, 6, 7	30	There will be two quizzes of 15 questions each. As each assessment is equivalent to only 15% of the total grade, there will not be replacements if the student misses it.	No
2	Practicals (cat spays)	3, 6	5	-	No
3	Written Examination (2 hrs)**	1, 2, 3, 4, 5, 6, 7	0	Weighting: 50%	No
4	Practicals (OSCE)	1, 2, 3, 4, 5, 6, 7	15	5% for each station	No

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

2

Additional Information for ATs

A failing grade in the Practical examination (OSCEs) will lead to an overall F grade for the entire course. Students must pass the Practical Examination (OSCEs) before live animal surgery (i.e. cat spays).

QUIZZES

*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). Questions will be taken from each respective "block" of lectures given before each quiz (and not cumulative).

This is an electronic-based examination using Canvas and LockDown Browser is required (Students are responsible for their login credentials and password). Students will be notified of the examination venue in due course, and late students may not be allowed in the room.

Each assessment corresponds to 15% 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.

FINAL EXAMINATION

**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 emphasizing clinical reasoning (cases), principles, and concepts related to anaesthesia and pain management.

Where and how: This is an electronic-based examination using Canvas and LockDown Browser is required (Students are responsible for their login credentials and password). Please refer the examination timetable on AIMS for the examination venue.

Other reminders:

According to the required best practices for examinations on the BVM Assessment Policy, some gentle reminders are provided:

- Bring your student ID card as proof of identity
- Late arrivals may 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
- Only CityUHK-approved calculators are allowed
 - https://www.cityu.edu.hk/arro/exam/exam_main.htm
 - <https://www.cityu.edu.hk/arro/file/exam/List of Approved Calculators.pdf>
- Be reminded to manage your time carefully and to take responsibility for your examination environment
- 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:
 - Students are required 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-)

(For 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

See additional information for AR regarding mark range below, as in the BVM programme only C+ and C grades are awarded.

Marginal (D)

Not applicable for the BVM programme

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-)

(For 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;

See additional information for AR regarding mark range below, as in the BVM programme only C+ and C grades are awarded.

Marginal (D)

Not applicable for the BVM programme

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

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-)

(For 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

See additional information for AR regarding mark range below, as in the BVM programme only C+ and C grades are awarded.

Marginal (D)

Not applicable for the BVM programme

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

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-)

(For 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.

See additional information for AR regarding mark range below, as in the BVM programme only C+ and C grades are awarded.

Marginal (D)

Not applicable for the BVM programme

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

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-)

(For 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.

See additional information for AR regarding mark range below, as in the BVM programme only C+ and C grades are awarded.

Marginal (D)

Not applicable for the BVM programme

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.

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-)

(For 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;

See additional information for AR regarding mark range below, as in the BVM programme only C+ and C grades are awarded.

Marginal (D)

Not applicable for the BVM programme

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

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-)

(For 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.

See additional information for AR regarding mark range below, as in the BVM programme only C+ and C grades are awarded.

Marginal (D)

Not applicable for the BVM programme

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.

Assessment Task

Practical examination OSCE

Criterion

Demonstrates safety and competency in practical skills manner.

Excellent (A+, A, A-)

Excellent execution of task with few or no errors. No safety concerns.

Good (B+, B, B-)

Good execution of task, with some minor permissible errors. No safety concerns.

Fair (C+, C, C-)

(For C+, C) Adequate execution of task, but with more significant errors. No safety concerns.

Marginal (D)

Not applicable for the BVM programme

Failure (F)

Fails to demonstrate appropriate level of competency in practical procedures or completes procedures in an unsafe manner.

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+: $\geq 92\%$
 A: $\geq 87-91.99\%$
 A-: $\geq 82-86.99\%$
 B+: $\geq 75-81.99\%$
 B: $\geq 68-74.99\%$
 B-: $\geq 61-67.99\%$
 C+: $\geq 54-60.99\%$
 C: $\geq 50-53.99\%$
 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