

# APAV 81: CLINICAL PATHOLOGY METHODS

## Foothill College Course Outline of Record

Heading	Value
<b>Units:</b>	5
<b>Hours:</b>	48 lecture, 36 laboratory per quarter (84 total per quarter)
<b>Prerequisite:</b>	APAV 55; per California Code of Regulations, this course is limited to students admitted to the Advanced Veterinary Assisting Apprenticeship Program.
<b>Degree &amp; Credit Status:</b>	Degree-Applicable Credit Course
<b>Foothill GE:</b>	Non-GE
<b>Transferable:</b>	CSU
<b>Grade Type:</b>	Letter Grade Only
<b>Repeatability:</b>	Not Repeatable

## Description

Fundamental studies of laboratory techniques and procedures involved in evaluating veterinary clinical samples. Areas of study include hematology, urinalysis, coagulation assessment, blood biochemistry and immunological testing, serology, clinical parasitology, and cytology. The veterinary technician's role in sample collection, sample storage and handling, and performance of analytic procedures will be emphasized. Skills are developed in the use of laboratory equipment, laboratory safety and management, and quality control and quality assurance.

## Course Objectives

The student will be able to:

- A. Recognize and discuss the responsibilities of the veterinary technician in a clinical laboratory setting as it relates to the veterinarian, other veterinary health care team members, and the patient.
- B. Discuss, evaluate and perform basic procedures in veterinary hematology, including preparation and staining of blood smears; blood cell identification and enumeration; and determination of blood parameters and indices.
- C. Discuss, evaluate and perform basic procedures in veterinary urinalysis, including sample preparation; determination of physical and biochemical properties; and microscopic sediment examination.
- D. Discuss, evaluate, and perform basic procedures in veterinary coagulation assessment, including sample handling and common coagulation tests.
- E. Discuss, evaluate, and perform basic procedures in veterinary serum biochemistry including organ function tests and health profiles utilizing automated blood analyzers.
- F. Discuss, evaluate, and perform basic procedures in veterinary serology, including comparing and contrasting the methodologies employed in serological and immunologic testing.
- G. Discuss, evaluate, and perform basic procedures in veterinary cytology, including sample collection and preparation, and cell identification.
- H. Discuss, evaluate, and perform basic procedures in veterinary clinical parasitology including identification of hemoparasites, and common internal and external parasites.

## Course Content

- A. Role of the veterinary technician in the clinical laboratory
  1. Definition of clinical pathology
  2. Roles of veterinary technician in the clinical pathology laboratory
  3. Responsibility of the veterinary technician to the veterinarian, other members of the health care teams and patient
  4. Quality control and quality assurance
  5. Laboratory safety and management
  6. Introduction to manual and automated laboratory equipment
- B. Veterinary hematology
  1. Characteristics of blood and formation of blood elements
  2. Sample collection, storage, and preparation
  3. The complete blood count
    - a. Preparation and staining of the blood smear and buffy coat smear
    - b. Hematocrit: packed cell volume and total protein
    - c. The differential white blood cell count, including white blood cell morphology
    - d. Red blood cell morphology and indices
    - e. Reticulocyte count
    - f. Platelet morphology, estimate and count
  4. Classification of anemia
  5. White blood cell responses in disease
  6. Use of clinical laboratory equipment for analyzing blood
  7. Quality control and quality assurance
- C. Veterinary urinalysis
  1. Review of renal function and formation of urine
  2. Sample collection, storage, and preparation
  3. Indications for and value of urinalysis in patient assessment
  4. Examination of urine
    - a. Physical examination
    - b. Chemical examination
    - c. Microscopic examination of urine sediment: identification and enumeration of formed elements
    5. Clinical significance of urinalysis findings
    6. Safe and proper collection and handling of urine
    7. Proper use of equipment used in performing urinalysis
    8. Quality control and quality assurance
- D. Veterinary coagulation assessment
  1. Platelets and primary hemostasis; clotting factors and secondary hemostasis
  2. Sample collection, storage, and preparation
  3. Bleeding time test
  4. Whole blood clotting time test
  5. Coagulation screening, including assessment of the intrinsic and extrinsic clotting systems
  6. Common veterinary hemostatic disorders
  7. Quality control and quality assurance
- E. Veterinary biochemistry
  1. Applications of biochemistry profiles and individual organ function tests
  2. Sample collection, storage, and preparation
  3. Principles of enzyme assay and biochemical reaction testing
    - a. Discussion of dry chemistry methodologies
    4. Importance of quality control and reference ranges
    5. Specific biochemistry tests for evaluation of organ function
    6. Proper use and care of automated chemistry analyzers
    7. Quality assurance of automated chemistry analyzers
- F. Veterinary serology
  1. Review of basic immunologic responses
  2. Applications of serology and immunodiagnostics to veterinary clinical diagnosis

3. Sample collection, storage, and preparation
4. Methodologies used in immunodiagnostic testing
5. ELISA technology: principles, reactants, kits
6. Fluorescent antibody testing
7. Basic interpretation of the results of immunodiagnostic tests
8. Quality control and quality assurance
- G. Veterinary cytology
  1. Common clinical samples and their diagnostic value
  2. Sample collection, storage, and preparation
    - a. Fine needle aspirates and impression smears
    - b. Swabs and scrapings
    - c. Fluid analysis
  3. Vaginal cytology
- H. Veterinary clinical parasitology
  1. Hemoparasites
  2. Common internal parasites
  3. Common external parasites
  4. Quality control and quality assurance

## Lab Content

- A. Complete blood count (CBC)
  1. Blood film preparation
  2. Staining slides
  3. Packed cell volume
  4. Total protein
  5. Total WBC count
  6. Differential white blood cell count
  7. RBC count and morphology
- B. Blood chemistries and serology
  1. Prepare serum and plasma for analysis
  2. Serum chemistry panel
  3. Perform serologic test (ELISA)
- C. Diagnostic procedures for blood microfilaria
  1. Direct drop
  2. Modified Knott's Test
- D. Urine collection
  1. Voided sample (dog)
  2. Cystocentesis (GROUP)
  3. Place a urinary catheter in a male dog (GROUP)
- E. Urinalysis
  1. Specific gravity
  2. Chemical analysis
  3. Sediment analysis
- F. Diagnostic procedures for fecal parasites
  1. Direct fecal smear
  2. Fecal flotation
  3. Fecal centrifugation and read fecal slide
- G. Vaginal cytology
  1. Collect and prepare vaginal cytology – canine (GROUP)
- H. Coagulation test
  1. BMBT and/or ACT (GROUP)

## Special Facilities and/or Equipment

Classroom equipped with multimedia presentation and projection capabilities. Computers with Internet access. Laboratory equipped with microscopes, centrifuges, slides, tubes. Clinical laboratory equipment: manual and automated cell counters, biochemistry analyzers, dry chemistry tests, stains and accessories. Access to clinical samples from dogs and cats.

## Method(s) of Evaluation

Some or all of the following methods of evaluation will be used:

- A. Written examinations.
- B. Practical examinations.
- C. Written case study.
- D. Demonstration of the required essential skills taught in this class using standard criteria for competency.

## Method(s) of Instruction

- A. Lecture
- B. Discussion
- C. Laboratory
- D. Demonstration

## Representative Text(s) and Other Materials

Hendrix, Charles M., and Margi Sirois. Laboratory Procedures for Veterinary Technicians. 6th ed. Elsevier, 2016.

Reagan, et al. Veterinary Hematology: Atlas of Common Domestic Species. 2nd ed. Wiley-Blackwell, 2008.

Although one or more text is older than the suggested "5 years or newer" standard, it remains a seminal text in this area of study.

## Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments

- A. Reading assignments: Weekly reading assignments from text, class handouts, and online sources ranging from 50 to 100 pages per week.
- B. Written short answer essay questions.
- C. Written case study.

## Discipline(s)

Registered Veterinary Technician