

# V T 81: CLINICAL PATHOLOGY METHODS

## Foothill College Course Outline of Record

Heading	Value
Units:	5
Hours:	4 lecture, 3 laboratory per week (84 total per quarter)
Prerequisite:	BIOL 41.
Degree & Credit Status:	Degree-Applicable Credit Course
Foothill GE:	Non-GE
Transferable:	CSU
Grade Type:	Letter Grade Only
Repeatability:	Not Repeatable

## Student Learning Outcomes

- Outline and explain the steps and rationale for performing the Complete Blood Count (CBC). Assemble all required equipment and materials and perform a Complete Blood Count (CBC) on a animal blood sample.
- Assemble all required equipment and materials and perform a Complete Urinalysis (UA) on a animal urine sample.

## 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. Intended for students in the Veterinary Technology Program; enrollment is limited to students accepted in the program.

## Course Objectives

The student will be able to:

- 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.
- discuss and demonstrate the safe and proper collections, handling and storage of clinical samples.
- demonstrate skill in the proper use of various types of clinical laboratory equipment.
- 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.
- discuss, evaluate and perform basic procedures in veterinary urinalysis, including sample preparation, determination of physical and biochemical properties, and microscopic sediment examination.
- discuss, evaluate, and perform basic procedures in veterinary coagulation assessment, including sample handling and common coagulation tests.

- discuss, evaluate, and perform basic procedures in veterinary serum biochemistry, including organ function tests and health profiles utilizing automated blood analyzers.
- discuss, evaluate, and perform basic procedures in veterinary serology, including comparing and contrasting the methodologies employed in serological and immunologic testing.
- discuss, evaluate, and perform basic procedures in veterinary cytology, including sample collection and preparation, and cell identification.
- discuss, evaluate, and perform basic procedures in veterinary clinical parasitology, including identification of hemoparasites, and common internal and external parasites.

## Course Content

- 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.
  - Definition of clinical pathology
  - Roles of veterinary technicians in the clinical pathology laboratory
  - Responsibility of the veterinary technician to the veterinarian, other members of the health care teams and patient
  - Quality control and quality assurance
  - Laboratory safety and management
  - Introduction to manual and automated laboratory equipment
  - Recognition, assessment, and timely communication of abnormal findings with medical team
- Discuss and demonstrate the safe and proper collections, handling, and storage of clinical samples.
  - Use of proper syringes, needles, containers
  - Safe, low stress, efficient collection of samples from patients
  - Appraise samples for suitability
  - Correct processing and storage of samples
- Demonstrate skill in the proper use of various types of clinical laboratory equipment.
  - Refractometer
  - Centrifuges
  - Microscope with oil immersion
  - Hemocytometer
  - Automated CBC, chemistry
  - Fecal analysis
- 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.
  - Characteristics of blood and formation of blood elements
  - Sample collection, storage, and preparation
  - The complete blood count
    - Preparation and staining of the blood smear and buffy coat smear
    - Hematocrit: packed cell volume and total protein
    - The differential white blood cell count, including white blood cell morphology
    - Red blood cell morphology and indices
    - Reticulocyte count
    - Platelet morphology, estimate and count
  - Classification of anemia
  - White blood cell responses in disease
- Discuss, evaluate and perform basic procedures in veterinary urinalysis, including sample preparation, determination of physical and biochemical properties, and microscopic sediment examination.
  - Review of renal function and formation of urine
  - Sample collection, storage, and preparation
  - The 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
- F. Discuss, evaluate, and perform basic procedures in veterinary coagulation assessment, including sample handling and common coagulation tests.
  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
- G. Discuss, evaluate, and perform basic procedures in veterinary serum biochemistry, including organ function tests and health profiles utilizing automated blood analyzers.
  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
  - H. Discuss, evaluate, and perform basic procedures in veterinary serology, including comparing and contrasting the methodologies employed in serological and immunologic testing.
    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
      - I. Discuss, evaluate, and perform basic procedures in veterinary cytology, including sample collection and preparation, and cell identification.
        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
      - J. Discuss, evaluate, and perform basic procedures in veterinary clinical parasitology, including identification of hemoparasites, and common internal and external parasites.
        1. Parasites of blood and blood cells
          - a. Blood smear
          - b. *Dirofilaria* ELISA and Knott
        2. Common gastrointestinal parasites of dog, cat, and horse
        3. Urinary parasites of dog and cat
        4. Fecal float
          - a. Gravity
          - b. Centrifugation
        5. Direct smear

## Lab Content

Practical training in the American Veterinary Medical Association Committee on Veterinary Technician Education and Activities List of Essential Skills Expected of Graduate Veterinary Technicians, using a set of standard criteria as a guideline for the accomplishment of performance objectives. Emphasis is on skill development and hands-on experience in all required areas.

## Special Facilities and/or Equipment

- A. Laboratory equipped with biological laboratory equipment, such as microscopes, centrifuges, glassware, gloves, smocks.
- B. Clinical laboratory equipment: manual and automated cell counters, biochemistry analyzers, incubator, reagents, and accessories.
- C. Live animal sources for clinical samples.

## Method(s) of Evaluation

- A. Written examinations.
- B. Practical examinations.
- C. Completion of an essential skills competency checklist using standard criteria.

## Method(s) of Instruction

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

## Representative Text(s) and Other Materials

Sirois, Margi. Laboratory Procedures for Veterinary Technicians. 7th ed. Elsevier, 2019.

Optional: Any veterinary hematology atlas, online or print.

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

- A. Weekly reading assignments from text, class handouts, and outside sources, ranging from 50-100 pages per week.
- B. Critical evaluation of common collection, handling, processing, and recording scenarios.

## Discipline(s)

Registered Veterinary Technician