Bergen Community College
Veterinary Technology Program

Course Title:	Clinical Lab Procedures I
Course Number:	Vet 205
Division:	Health Professions
Department:	Veterinary Technology
Credits:	3
Classroom Hours:	2
Laboratory Hours:	3
Prerequisites:	Admission into the professional segment of the Veterinary Technology Program; Vet 102, Vet 103, Vet 112, Bio 215

Course Description

This course deals with the examination of blood and urine for diagnostic and prognostic purposes in veterinary practice. Students will learn to perform several tests including complete blood counts, blood chemistries, serological tests, and complete urinalyses. Lecture periods will cover the theories on which the tests are based and the relevance of quality laboratory results in the evaluation of the health of animals.

Course Goals

Upon completion of this course, the student should receive a foundation in:

- Proper collection & handling techniques for blood and urine samples
- Automated cell counting
- Performing a complete blood count, including microscopic examination of a blood film
- Calculating hematologic indices
- Slide preparation techniques
- Staining techniques
- Identification of selected blood parasites of domestic and exotic species
- Performing automated coagulation profiles
- Performance of blood chemistry assays
- Preparation of serum samples
- Performance of serologic tests using ELISA methodology and lateral flow immunoassay
- Proper method for performing a complete urinalysis
- Proper specimen handling techniques, and preparation of samples for shipment to outside laboratories
- Proper instruction for the maintenance of laboratory equipment, and the importance of quality control
- Safety equipment available in the clinical laboratory and standard safety procedures

Performance Objectives

Upon completion of this course, the student should be able to:

- Identify commonly used laboratory instruments and equipment, and describe proper procedures for their operation, care, and maintenance
- Explain "quality control" and associated terms, along with their importance in maintaining high standards and accuracy in a clinical setting
- Differentiate between precision and accuracy
- List the common sources of error in clinical testing
- Describe the safety equipment available in the clinical laboratory along with correct usage
- Explain standard safety procedures carried out in the clinical laboratory
- Identify common samples and materials used in the laboratory, along with proper handling and disposal
- List the phases of hematopoiesis and describe the events that occur in each
- List the hematopoietic organs and identify the role of each in hematopoiesis
- List the cells in the erythrocyte, granulocyte, and agranulocyte maturation process and identify the general trends seen in cell development
- Describe the normal appearance of erythrocytes, leukocytes, and thrombocytes, along with species variations
- Identify the morphologic abnormalities of erythrocytes, leukocytes, and thrombocytes
- Describe the general function of erythrocytes, leukocytes, and thrombocytes
- Define medical terms associated with erythrocytes, leukocytes, and thrombocytes
- Define "anticoagulant" and explain the mechanism by which each type functions
- Understand the criteria to perform a microscopic examination of a blood film, including a leukocyte differential blood cell count, evaluating erythrocyte morphology, estimating platelet numbers, calculating absolute values, a corrected white blood cell count, and hematologic indices
- Identify stains commonly used in a clinical setting
- Describe the procedures for measuring thrombocyte numbers
- Define hemostasis and the role of thrombocytes in the blood coagulation mechanism
- Diagram the blood coagulation pathway, identify the coagulation factors, and describe the role of each
- List factors that can contribute to hemostatic defects
- Describe various coagulation tests and identify which portion of the pathway is evaluated by each
- List the components of nonadaptive and adaptive immunity
- Describe the structure of the immunoglobulins and the role of each in immunity, along with immunologic defects
- List and describe the types of antigen-antibody reactions that can occur in an organism
- List the parameters to consider in choosing an immunologic test kit
- Differentiate between sensitivity and specificity
- Describe various serologic test methods used to evaluate the immune system
- Describe the principle behind the ELISA technique for immunologic testing

- Describe the principle and procedure for cross-matching of blood
- List the types of instruments used in clinical chemistry testing, along with factors that can influence chemistry screen results
- Describe the general principles for enzyme testing
- Differentiate between endpoint and kinetic assays
- Identify and list the chemical tests used to evaluate liver and kidney function
- Describe the common methods for total protein measurement
- Identify and list the tests used to evaluate pancreatic function in an organism
- Describe the metabolism of glucose in healthy and diabetic individuals
- Describe the principle of analysis of serum electrolytes, including calcium, and phosphorus
- Explain the various methods of urine sample collection, as well as proper handling of samples
- Describe the procedure for determination of specific gravity of a urine sample
- List the factors which can affect the color and clarity of a urine sample, along with species variations
- Understand the criteria to perform a complete urinalysis, including advantages and disadvantages of urine dipstick tests, identifying formed elements that may be found in urine, and other chemical analyses performed on urine
- Define medical terms associated with the urinary system

Course Materials

Primary (required):

Hendrix, Charles M & Sirois, Margi: *Laboratory Procedures for Veterinary Technicians;* 5th Edition, St. Louis, Missouri, 2007, Mosby/Elsevier

Reagan, WJ, Sanders, TG, DeNicola, DB: *Veterinary Hematology Atlas of Common Domestic Species,* Ames, Iowa, 1998, Iowa State University Press

Suggested (not required):

Cowell, Rick L., Tyler, Ronald D., Meinkoth, James H: *Diagnostic Cytology and Hematology of the Dog and Cat;* 2nd edition, St. Louis, Missouri, 1999, Mosby

Bassert, Joanna M. & Thomas, John A: *Clinical Textbook for Veterinary Technicians; 8*th edition, St. Louis, Missouri, 2014, Elsevier-Saunders

Crow, SE, Walshaw, SO, Boyle, JE: *Manual of Clinical Procedures in Dog, Cats, Rabbits & Rodents, 3rd* edition, Ames, Iowa, 2009, Wiley-Blackwell

Course Website

Vet-205 is a "web-enhanced" class. The class has its own website, and each member of the class has an account for the website. The BCC online course management system is known as "Moodle."

To access your course in Moodle open a browser and go to the Portal site http://my.bergen.edu. You can find instructions on how to login to the Portal and connect to Moodle via Portal listed on the Portal Help Site (http://www.bergen.edu/portalhelp/Pages/StudentHelp.aspx).

1) Your user name is the same as your WebAdvisor username.

2) For your initial password, users logging into http://my.bergen.edu (the Portal) for the first time will use the first 2 letters of their last name with the first letter capitalized, plus the last 6 digits of your Bergen Community College Identification number. For example,
   Name = Pat O'Shaunessy BCC ID = 354210 Initial Password = Os354210
   Name = Nancy McDouglas BCC ID = 0054532 Initial Password: Mc054532

   Please note that after logging in, you will be forced to change your password. Your password must be at least 8 characters long. It must contain a number, and an UPPER case letter and a Lower case letter. Your password cannot be any of your previous 6 passwords.

   After you login to the portal site, you will find your Moodle course listed under MyClass sites. If you are logging in for the first time, you will be prompted to enter your username and password again. Follow the on-screen instructions to complete onetime setup of your password.

Unless you are on campus, you are responsible for supporting your own Internet access and email account throughout the course.

If you still have difficulty logging in, please call the help desk at **1-877-612-5381.**

Teaching Methodologies

Classroom activities will include lectures, with power point slides, audiovisual presentations and large group discussions. Lectures will emphasize the significance of clinical evaluation in veterinary practice with discussion of test principles and methodologies. Laboratory exercises will provide experience in performing test methodologies, using appropriate instrumentation, calculations, quality control applications, and data reporting. Labs will be held at the Veterinary Technology Building on Bergen campus.

Lecture Grading Policy*

Lecture grades will be averaged as follows for 50% of the final course grade:

Lecture Assignments	5%
Exam #1	10%
Exam #2	10%
Exam #3	10%
Comprehensive Final Exam	15%

Lecture assignments are online—opening and closing dates are provided in the course outline and

also posted in Moodle. Grades and general feedback on assignments are provided in Moodle. It behooves you to check Moodle frequently, as late assignments will not be accepted. No lecture quizzes will be dropped from your final lecture grade.

There will be three written unit exams given at times selected and announced in advance by the instructor, and a comprehensive final examination. Exams will cover lecture material as well as textbook material (from required texts) and selected article readings and handouts. Exams will be given in a combination of multiple choice and clinical case formats. Students are expected to take exams as scheduled by the instructor. Failure to attend a scheduled examination requires the student to contact the instructor within 3 days of the scheduled exam date and provide a (written) bona fide excuse for the absence. Upon demonstration of a verifiable absence, the instructor will provide a make-up examination which will be given in a format of the instructor's choice—oral, essay, fill-in, short answer, etc. The exam will be administered on a day and in a location designated by the instructor. Failure to contact the instructor within this given time frame will result in a grade of 0 for that exam.

*IMPORTANT NOTE: Students must obtain a minimum of an overall 76% in the lecture to successfully pass the course (independent of the laboratory grade).

Laboratory Grading Policy*

The laboratory grade will be averaged as follows for 50% of the course grade:

Attendance, preparation & active participation	5%
Laboratory assignments	10%
Hematology practical examination	15%
Final comprehensive practical exam	20%

*IMPORTANT NOTE: The student must obtain a minimum of an overall 80% in the final laboratory grade to pass the course (independent of the lecture).

Lab Attendance, Preparation & Active Participation:

Each student will be required to bring related reading and materials to each laboratory session. Students must wear appropriate attire (as outlined in the Veterinary Technology Handbook), and adhere to safety guidelines outlined, provided, and posted. Each student will be required to bring in a watch (for timing tests) and will be allowed a basic function calculator. No cell phones will be allowed in the lab (with rare exception and approved in advance by the instructor). As a student in the lab, you will be responsible for leaving the laboratory and meeting room clean. All biologic specimens should be recorded in a central logbook, which is located in the lab. Lockers, located by the rear offices, are provided for the student to store personal belongings. Locks should be provided by the student. Practical exams are primarily hands-on and related to essential skills. Exams begin promptly. If you are late for an exam, you will not be provided extra time. The attendance and participation portion of the laboratory grade will be based on

weekly evaluations in the following areas (with an opportunity to score up to 10 pts each lab session):

1 Student was on time to lab session (1 pt)
2 Student was properly attired for lab session (1 pt)
3 Student brought required materials to lab session (1 pt)
4 Student was academically prepared for lab session (i.e. able to answer questions related to the laboratory session) (1 pt)
5 Student was attentive and followed instructions in lab (1 pt)
6 Student actively participated and worked independently in lab (1 pt)
7 Student practiced time management in lab (1 pt)
8 Student followed safety guidelines in lab (1 pt)
9 Student recorded biologic samples in central logbook (1 pt)
10 Student cleaned up after laboratory session (1 pt)

Laboratory Assignments:

Each lab will have a corresponding online laboratory assignment. Questions are related to the lab performed on a given week. The opening and closing dates for submitting the assignment are posted on Moodle and in the lab schedule. These assignments are an individual effort and academic integrity is expected. There is access to computers on campus for all students. At the discretion of the lab instructor, one lab assignment may be dropped from this portion of the grade. Late assignments, however, will not be accepted.

Veterinary Program Grading Policy:

91-100 = A
88-90 = B+
83-87 = B
80-82 = C+
78-79 = C
< 78 = F

Clinical Competency Evaluations

In addition to the regular coursework required, students will complete clinical competencies for a list of essential skills associated with the course topic, as dictated by the AVMA accrediting body. Areas of clinical laboratory procedures relate to specimen management and analysis. Students will work individually (or in groups where indicated) to achieve a satisfactory competence level necessary for each required skill. A list of skill sets will be available (by appointment) in the Veterinary Technology building for ongoing review. Students must perform ALL the essential skills required in this course. The student will be given the opportunity to complete these skills during regular class time. All skills performed during the semester will be evaluated by the instructor, who will provide a signature after the successful completion of a task. If any essential skill is not completed after the first scheduled attempt, the

student and instructor will meet to discuss and make arrangements for a second opportunity. If clinical competency remains unsatisfactory after two attempts, the student, instructor, and program director will meet to discuss further options for successful completion of the course.

Lecture & Laboratory Resources

Learning resources are posted on Moodle; they are designed to supplement the lecture and laboratory performance objectives and are not meant to serve as a replacement for attending class.

Lecture Attendance Policy

Attendance and classroom participation are of utmost importance. Students are expected to be present and on time for all classes. Attendance will be recorded each session. It is your responsibility to sign in during the class in order to receive credit for attendance. Whether you are late or absent for a particular class, you are responsible for all material covered in your absence—this material should be obtained from a classmate. Missing >3 lecture sessions (lateness > 20 minutes will be counted as ½ absence) will result in failure for this course. You will be referred to the program director in the event this should happen. If you are late for a lecture, please enter the classroom quietly and without interruptions. You can contact the lecturer at the break or after lecture for any announcements you may have missed.

Laboratory Attendance Policy

Attendance is mandatory. Missing more than two lab sessions, regardless of the cause, will result in a failure for the course. Lateness > 20 minutes will count as ½ absence. You will be referred to the program director in the event this should happen. If you have a legitimate reason for missing a laboratory session, you must inform the instructor within 24 hours. If possible, another lab section may be offered. Labs cannot be made up in their entirety.

Student Accommodations

Students who require accommodations by the Americans with Disabilities Act (ADA) can request support services from the Office of Specialized Services of Bergen Community College, Room L-116, Pitkin Education Center, 201-612-5270 or www.oss@bergen.edu.

Rules and Regulations Governing Conduct

Each student is expected to obtain a copy of the Bergen Community Student Handbook and is responsible for knowing the information included in the Handbook. Copies are available in the Office of Student Life, the Welcome Center, evening office, and on the Bergen Web site.

In addition, each student accepted in the Veterinary Technology Program is expected to obtain a copy of the Veterinary Technology Student Handbook and is responsible for knowing the information included in this Handbook. Copies are available through the program director.

All student and faculty are governed by college rules and regulations. Please refer to the Student Handbook for information regarding codes of conduct.

Academic Integrity

Bergen Community College is committed to academic integrity. Please refer to the current Student Handbooks for details related to academic integrity/discipline.

Vet 205 Lecture Outline & Schedule*

Semester offered: Fall 2013
Lectures meet on Tuesdays 10:30am-12:25pm

WEEK	DATE	TOPIC	REQUIRED TEXT READING	ONLINE ASSIGNMENT
1	9/3/13	Introduction; Lab Equipment & Materials; Sample Handling; Hematology	Chapter 1 Chapter 2 pp. 27-68	Opens 9/3 Closes 10/8
2	9/17/13	Hematology		
3	9/24/13	Hematology		
4	10/1/13	Hematology		
5	10/8/13	Coagulation	Chapter 2 pp. 69-73; Chapter 8	Opens 10/8 Closes 11/5
6	10/15/13	Unit Exam #1/Coagulation continued		
7	10/22/13	Immunology		
8	10/29/13	Serology		
9	11/5/13	Chemistry Screens	Chapter 3	Opens 11/5 Closes 11/26
10	11/12/13	Unit Exam #2; Chemistries continued		
11	11/19/13	Chemistry Screens		
12	11/26/13	Urinalysis	Chapter 5	Opens 11/19 Closes 12/8
13	12/3/13	Urinalysis		
14	12/10/13	Unit Exam #3		
15	12/17/13	Comprehensive Final Exam		

*Lecture schedule subject to change

Vet 205 Laboratory Outline & Schedule*

Lab sections meet in the Veterinary Technology building:

Section 001: Weds 1:45-4:30pm
Section 002: Weds 4:45-7:30pm
Section 003: Thurs 1:45-4:30pm
Section 004: Thurs 4:45-7:30pm

WEEK	TOPIC	ONLINE ASSIGNMENT
1	Introduction: Lab Safety; Equipment & Materials; Microscope Review; Blood Smears	Opens 9/4 Closes 9/13
2	PCV/TS; Blood Smears; Stains	Opens 9/11 Closes 9/20
3	Hematology ID; Complete Blood Counts	Opens 9/18 Closes 9/27
4	Hematology ID; Hematology Calculations	Opens 9/25 Closes 10/4
5	WBC Differential Count	Opens 10/2 Closes 10/11
6	Large Animal & Exotics Hematology	Opens 10/9 Closes 10/18
7	Hematology Review & Practice; Coagulation Tests	NONE
8	Hematology Practical Exam	NONE
9	Serology & Blood Typing	Opens 10/30 Closes 11/8
10	Blood Crossmatching Procedures	Opens 11/6 Closes 11/15
11	Chemistry Screens	Opens 11/13 Closes 11/22
12	Complete Urinalysis	Opens 11/20 Closes 12/6
13	Complete Urinalysis	NONE
14	Comprehensive Final Practical Exam	NONE
15	Review	NONE

*Laboratory schedule subject to change

COURSE CONTACT INFORMATION

Lecture & Lab:

Dr. Cynthia Rockafellow
Program Veterinarian
Associate Professor
Office #S-336A
Office Phone: 201-493-5016
Veterinary Technology lab room: 201-493-3764
E-mail: crockafellow@ bergen.edu

Relevant Addresses and additional contact information:

Division of Health Professions
Department of Veterinary Technology
400 Paramus Road
Paramus, NJ 07652-1595

Health Professions Fax # 201-612-3876
Veterinary Technology office (program director): 201-612-5389

Lecture & Lab Office Hours:

Monday 12:30-1:30pm: S-336A
Tuesday 12:30-1:30pm: S-336A
Thursday 12:30-1:30pm: VetTech building

OR by appointment (please contact me by phone or e-mail at least 72 hours in advance of appointment)

Additional Laboratory Instructors:

Ms. Linda Gines, CVT
Ms. Lorena Lago, CVT

Syllabus updated 7/13