

COURSE SYLLABUS

Diagnostic Laboratory and Pathology

CVM 7040

2 Credit Hours

Course Director: Ana Alcaraz, DVM, PhD, DACVP

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Course Instructors: Antech pathologists and others as needed

Course Time and Location:

This course will take place at Antech Laboratories in Irvine, California. The course will include a regular working day, Monday to Friday, scheduled by the Clinical Preceptor. Students are expected to arrive at the laboratory at 8:00 AM, including those days in which schedule activities start at 9:00 AM. Weekend duty will not be required. A regular scheduled working week consists of 40-50 hrs/week, and approximately half of this time will be dedicated to review assigned cases or student-centered learning activities determined by the group of students attending the course. Additional independent study by individuals is expected.

Course Description: (Course Purpose, aims/goals)

This course is two weeks in duration and emphasizes the efficient and effective use of laboratory services in veterinary medicine. This course includes aspects on diagnostic clinical pathology, anatomical pathology, parasitology and microbiology (bacteriology and virology). Specimens from a variety of animal species are used as they are routinely processed in a veterinary diagnostic laboratory. Particular emphasis is placed on the practical applications of gross pathology and histopathology as an aid to assist general veterinary practitioners and animal owners in the identification of disease processes. Emphasis is placed on the proper collection and submission of clinical specimens from sick and deceased animals. The interpretation of laboratory tests results are reviewed and discussed. In this course students will acquire practical experience/ skills in techniques used for an effective necropsy, proper examination of specific organs, identification of lesions and postmortem changes. Students will become familiarized with basic principles of tissue preservation and processing for histopathology and the recognition and interpretation of microscopic findings.

Learning Objectives: (Supporting The Course Purpose)

1. Updated current concepts in the disciplines of Clinical Pathology, Virology, Bacteriology, Parasitology, Toxicology and Morphologic Pathology.
2. Review proper necropsy techniques, collection and submission of laboratory specimens
3. Discuss interpretation of laboratory findings

Course Policies and Procedures: (Attendance/Dress Code etc. – specific to course)

Class attendance - Attendance and participation is required in order to optimize the educational benefit for all students. Please review the Clinical Courses and Rotations Handbook for detailed policies and procedures regarding excused absences.

Professional behavior – Professional behavior is considered paramount to preserve an adequate learning environment and is expected of all course participants. Professional behavior includes, but is not limited to, tolerance of others beliefs and opinions, arriving on time, and being prepared.

Honor Code – In compliance with the University and College requirements and recommendations.

Students with special needs - Students seeking accommodations based on disabilities should contact the Center for Disability Issues & the Health Professions (CDIHP) office (909 469-5380) to coordinate reasonable accommodations for students with documented disabilities *prior to the beginning of the course*. Retroactive disabilities related accommodations will not be granted.

Course Equipment and Clothing

1. Students must wear protective clothing (Surgical scrubs or coveralls, plastic apron, pull over rubber boots; gloves) during necropsy
2. Students should not wear jewelry, e.g., rings, dangling earrings, loose bracelets and necklaces that could be caught on equipment or machinery. Hair should be worn so as not to expose the students to entrapment and injury.
3. Computers & communication links to remote resources are recognized as being integral to the educational experience.

Assessment: (Grades/Rubric/Exam)

At the end of the course the following factors will be used to evaluate students:

1. Theoretical knowledge and application of knowledge (multiple choice format; testing will occur during assessment week): 70%
2. Assessment by Clinical Preceptor: 20%
3. Assessment by Course Director (Large animal necropsies; quality and completeness of case logs) 10%
4. **Case Log**: The purpose of the case log is to document cases seen by each student during their course. This information should be entered on-line at the end of the course, no later than 8 am Pacific time Monday following the end of the course. Failure to submit the case log by the deadline will affect course grade (up to 10% deduction).

Course Schedule:

Students will be divided into 2 subgroups. Please see Appendix I for detailed daily schedule of activities for each subgroup. This schedule may be rearranged by the Clinical Preceptor according to faculty/staff availability.

During assessment week, supervised large animal necropsies (pigs, sheep, goats and cattle [calves]) will be performed in the CVM Multidisciplinary Classroom (MDC). All the students that have completed the course in the 8-week period prior to the assessment week are required to participate in this activity. The pigs and small ruminants utilized in this teaching activity will be animals that have died of natural causes and are donated by neighboring farms. Emphasis will be placed on necropsy technique, systematic examination of organ and tissues, and proper sampling of diagnostic specimens.

Resources:

Please see Appendix II for a list of some resources available for independent study at the rotation site. Based on Western University founding principle of student-centered learning, students are encouraged to find learning resources that fit their own learning style. However, traditional textbooks such as Jubb, Kennedy and Palmer; Jones Hunt and King; Thomson's Special Pathology; Duncan and Prasse's Clinical pathology; Thrall's Veterinary Hematology and Clinical Chemistry, could be useful. Images with good examples of gross and histologic lesions can be found in the International Slide Bank (CD and video disk format); and web pages such as Dr. King's necropsy show and tell (<http://w3.vet.cornell.edu/nst/nst.asp>). Antech's training modules in Canine and Feline Hematology, Avian and reptile Hematology, urinalysis and Veterinary Parasitology will be available for independent and group study. Additional learning resources are posted on Blackboard

Appendices: (Detailed Schedules/Assessment rubrics/University, College Information/Forms/Surveys etc.)

APPENDIX I.

Anatomical Pathology Subgroup **3 students/ 1 week**

Specific Objectives:

1. Learn to perform a complete necropsy in a safe and systematic manner.
2. Review general pathology concepts and the most common diseases in domestic animals.
3. Recognize, describe and interpret the most common lesions (circulatory, growth, pigmentary disturbances, degeneration, inflammation, neoplasia) found in domestic animals routinely submitted to a diagnostic laboratory for postmortem examination.

4. Recognize common post-mortem and age-related changes.
5. Select, collect and submit appropriate samples for histopathology, and ancillary tests such as hematology, serum biochemistry, microbiology, parasitology, toxicology, etc.
6. Identify, describe and interpret histologic lesions from postmortem cases and from biopsies routinely received in a diagnostic laboratory.
7. Establish final diagnosis, discuss pathogenesis of significant and/or incidental findings, and discuss the daily problems encountered by diagnostic pathologists.
8. Become familiarized with federal and state regulations regarding safe packaging and transportation of diagnostic specimens and the disposal of necropsy material.

Expected Outcomes:

1. Perform a routine necropsy
2. Prepare a necropsy report (gross findings only)
3. Follow a submitted biopsy through the histopathology laboratory i.e. from wet tissue to stained slide and get familiarized with the most common special stains used in diagnostic pathology.
4. Become familiarized with diagnostic tests.

DAILY SCHEDULE- ANATOMIC PATHOLOGY

MONDAY

8:00 a.m. - 9:00 a.m.	Protected group study time
9:00 a.m. – 12:00 p.m.	1) Introduction to Pathology Staff and Laboratory Tour 2) <i>Introduction to Antrim and Student Workstations</i> 3) <i>Overview of Necropsy Protocols and Tissue Grossing</i>
12:00 p.m. – 1:00 p.m.	LUNCH
1:00 p.m. – 2:30 p.m.	<i>“Hands On” in the Tissue Grossing Lab</i>
2:30 p.m. – 5:00p.m*	<i>Necropsies / Review of normal histology slides (or group study)</i>

TUESDAY

8:00 a.m. – 9:00 a.m.	<i>Protected group study time</i>
9:00 a.m. – 12:00 p.m.	1) <i>Pathology / Cytology Rounds</i> 2) <i>Overview of Tissue Embedding and Staining</i>
12:00 p.m. – 1:00 p.m.	LUNCH
1:00 p.m. – 2:00 p.m.	<i>“Hands On” in the tissue embedding lab</i>
3:00 p.m. – 5:00p.m*	<i>Necropsies / Assignment of gross-histopathology cases for Wednesday /Group Study</i>

WEDNESDAY

8:00 a.m. – 9:00 a.m.	<i>Protected group study time</i>
9:00 a.m. – 12:00 p.m.	1) <i>Pathology / Cytology Rounds</i> 2) <i>Study assigned gross/histopathology cases from Tuesday</i>

<i>12:00 p.m. – 1:00 p.m.</i>	LUNCH
<i>1:00 p.m. – 2:30 p.m.</i>	<i>Review and discussion of gross/histopathology cases from Tuesday with pathologists</i>
<i>2:30 pm – 5:00 pm*</i>	<i>Necropsies / Assignment of gross-histopathology cases for Thursday /Group Study</i>

THURSDAY

<i>8:00 a.m. – 9:00 a.m.</i>	<i>Protected group study time</i>
<i>9:00 a.m. – 12:00 p.m.</i>	1) Pathology / Cytology Rounds 2) Study assigned gross/histopathology cases from Wednesday
<i>12:00 p.m. – 1:00 p.m.</i>	LUNCH
<i>1:00 p.m. – 2:30 p.m.</i>	<i>Review and discussion of gross/histopathology cases from Wednesday with pathologists</i>
<i>2:30 pm – 5:00 pm*</i>	<i>Necropsies / Assignment of gross-histopathology cases for Friday / Group Study</i>

FRIDAY

<i>8:00 a.m. – 9:00 a.m.</i>	<i>Protected group study time</i>
<i>9:00 a.m. – 12:00 p.m.</i>	1) Pathology / Cytology Rounds 2) Study assigned gross/histopathology cases from Thursday
<i>12:00 p.m. – 1:00 p.m.</i>	LUNCH
<i>1:00 p.m. – 2:30 p.m.</i>	<i>Review and discussion of gross/histopathology cases from Thursday with pathologists</i>
<i>2:30 pm – 5:00 pm*</i>	<i>Necropsy/ Individual Assessments</i>

- **IMPORTANT NOTE: There is no guarantee that necropsies will be completed by 5:00 pm.**

Clinical Pathology Subgroup
3 students/ 1 week

Specific Objectives:

1. Recognize some of the artifactual findings in peripheral blood introduced by specimen collection and handling.
2. Read and interpret automated hematology results from cytograms (Advia).
3. Recognize the normal and abnormal morphology of erythrocytes and leukocytes and the clinical significance of these abnormalities.
4. Perform leukocyte differentials.
5. Know the primary neoplastic disorders of the hematopoietic system.
6. Collect and prepare diagnostic cytology samples.
7. Perform cytological examination to evaluate neoplasms and inflammation.
8. Recognize some of the common neoplasms by cytology.

9. Collect bone marrow specimens and recognize differentiate normal, cellular marrow samples from poorly collected, primarily fat containing samples.
10. Evaluate by laboratory methods the disorders of renal function, pancreatic function, liver function, endocrine function and gastrointestinal disease.
11. Know how to use enzymology to evaluate disorders of various body systems.

DAILY SCHEDULE- CLINICAL PATHOLOGY

MONDAY

8:00 a.m. - 9:00 a.m.	Protected group study time
9:00 a.m. – 12:00 p.m.	<ol style="list-style-type: none"> 1. Introduction to Pathology Staff and Laboratory tour 2. Introduction to Antrim and Student's workstations 3. "Introduction to the Laboratory" (an Internet module) 4. Assignment of cytology cases and review
12:00 p.m. – 1:00 p.m.	LUNCH
1:00 p.m. – 2:00 p.m.	<i>Detailed laboratory observations of cytology staining</i>
2:00 p.m. – 3:30p.m	<i>Review assigned cytology cases</i>
3:30 p.m. – 5:00 p.m.	<i>Discussion of assigned hematology cases with clinical pathologists</i>

TUESDAY

8:00 a.m. – 9:00 a.m.	<i>Protected group study time</i>
9:00 a.m. – 12:00 p.m.	<ol style="list-style-type: none"> 1. Pathology / Cytology Rounds 2. Assignment of hematology cases 3. Review hematology cases/ modules
12:00 p.m. – 1:00 p.m.	LUNCH
1:00 p.m. – 2:00 p.m.	Detailed observations of the laboratories/ hematology area, running samples by the automated hematology equipment, preparing slides for differentials and staining.
2:00 p.m. – 3:30 p.m	Review assigned hematology cases
3:30 p.m. – 5:00 p.m.	Discussion of assigned hematology cases with clinical pathologists

WEDNESDAY

8:00 a.m. – 9:00 a.m.	<i>Protected group study time</i>
9:00 a.m. – 12:00 p.m.	<ol style="list-style-type: none"> 1. Pathology/ cytology rounds 2. Assignment of clinical chemistry / microbiology cases 3. Review clinical chemistry and microbiology cases/ modules
12:00 p.m. – 1:00 p.m.	LUNCH

1:00 p.m. – 2:00 p.m. Detailed observations of the laboratory clinical chemistry/ serology/microbiology areas including the labeling, running, and reporting of clinical chemistry samples

2:00 p.m. –3:30 p.m. Review assigned clinical chemistry cases

3:30 p.m. – 5:00 p.m. Discussion of assigned clinical pathology cases with clinical pathologists

THURSDAY

8:00 a.m. – 9:00 a.m. *Protected group study time*

9:00 a.m. – 12:00 p.m.

1. Pathology/ cytology rounds
2. Assignment of urology cases
3. Review urology cases/ modules

12:00 p.m. – 1:00 p.m. LUNCH

1:00 p.m. – 2:00 p.m. Detailed observations of the laboratories/urinalysis area including the processing and reporting, urine biochemistries and urine sediments

2:00 p.m. –3:30 p.m. Review assigned urology cases

3:30 p.m. – 5:00 p.m. Discussion of assigned urology cases with clinical pathologists

FRIDAY

8:00 a.m. – 9:00 a.m. *Protected study time*

9:00 a.m. – 12:00 p.m.

1. Pathology/ cytology rounds
2. Assignment of parasitology cases
3. Review parasitology cases/ modules
4. Detailed observations of the laboratories/ parasitology area. Observations on preparing and performing fecal exams.

12:00 p.m. – 1:00 p.m. LUNCH

1:00 p.m. – 2:00 p.m. Review assigned parasitology cases

2:00 p.m. –3:30 p.m. Discussion of assigned parasitology cases with clinical pathologists

3:30 p.m. - 5:00 p.m. *Group study, individual assessments.*

Note: Daily schedules for anatomic and clinical pathology are subject to change according to case and personnel availability.