Biomed 4110/8401

Veterinary Cytology

**COURSE PROFILE**

Course Description This course of Veterinary Cytology is designed to hone the skills of the practicing Veterinary Technician, Veterinary Student or Veterinarian and assumes some basic knowledge of microscope usage and normal hematology. The review of normal cells will be minimal and emphasis will be placed on findings associated with inflammatory and neoplastic diseases. Higher level course will include discussion of ancillary tests, special stains and treatment alternatives. The focus will be on canine and feline diseases but some common equine and bovine diseases will be covered.

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Major Objectives After Completion of the course a student will be able to:

1. Recognize and understand the pathogenesis of common inflammatory patterns
2. Recognize the common fungal and bacterial diseases diagnosed via cytology
3. Differentiate the cytologic features of round cell tumors, epithelial tumors and mesenchymal tumors
4. Identify the five common round cell tumors
5. Understand the identifying characteristics and pathogenesis of body cavity effusions
6. Recognize common findings in respiratory cytology
7. Differentiate a reactive lymph nodes from lymphoma or metastatic disease
8. Recognize common findings in liver and spleen cytology
9. Recognize common findings in ear and fecal cytology
10. Be able to identify the phase of the estrus cycle of the dog using cytology

Graduate level work will include the understanding of the use of special stains, advanced diagnostics, ancillary tests and the prognosis and pathogenesis of diseases.

Prerequisites 4000 level – Junior or Senior standing. An AAS or equivalent degree in veterinary technology from an American Veterinary Medical Association-accredited program. Biomed 3200 (Comparative Hematology) and Biomed 2110 (Biomedical Terminology) are highly recommended. Review of normal cells will be minimal and student should have sufficient background in cell biology and tissue structure to understand basic terminology.

 8000 level – DVM degree or equivalent

Delivery Students are not required to attend class at regular times; however, it is important that they follow the attendance/participation guidelines and meet due dates and deadlines for readings, assignments, discussions, quizzes, and exams. Communications will be through the discussion board, announcements, and emails. Real time video conferencing is possible on request. Course delivery strategies may include: reading from required textbook(s), Aperio Digital Microscopy slides, reading resources linked to the internet, brief audio or audio/video lectures, assigned projects, use of the discussion board, use of the internet, and e-mails.

Organization Course materials are located under the left-hand tab in the course Blackboard site under “Units”. “Sessions” are found under “Units” and “Modules” under “Sessions”. Further directions are provided in Blackboard.

Required Materials Canine and Feline Cytology, Raskin and Meyer. 2nd edition 2010 Elsevier.

**EVALUATION OF**

**STUDENT**

**PERFORMANCE**

Satisfactory

Performance Undergraduate performance: Points will be earned via weekly participation in discussions, blogs or journals. There will be both group and individual assignments. There will be several proctored exams, un-proctored timed quizzes and a final portfolio project to create a cytology portfolio.

Graduate performance: In addition to the above requirements, graduates students will be expected to provide more in depth analysis during weekly blogs and assignments. They will also produce a portfolio project with a greater degree of knowledge and detail than the undergraduate students. Exam and quiz questions will be different than the undergraduate class and will reflect this higher performance standard.

Exams and Quizzes Exams are available only under the supervision of a proctor. Ninety minutes will be allowed for exams.

* + - * + Quizzes are not proctored, but you are expected to complete the quizzes by yourself. With the exception of the syllabus quiz, each quiz is timed so that you will not have time to rely on reference materials, i.e. they are not open-book quizzes.
				+ If you take more time than the quiz or exam allows, your score will be deducted the points of one question each minute in overtime.
				+ You may take a quiz or exam only once. You must complete the exam or quiz once you start it. You may NOT come back to the quiz later. If you are disconnected during an exam, contact the instructor immediately and then send an e-mail to blackboard@missouri.edu with your name, username, course name, title of the quiz or exam, and a description of the problem. To ensure your answers are logged, click “Save” at the bottom of the page every 2 to 3 questions. Click “Submit” after you have reviewed your answers to have the quiz or exam graded.

Scoring of Assignments In addition to exams and quizzes, students will be scored on course participation by submitting blogs and answering discussion questions. Graduate assignments will have expanded objectives and be worth more points. The graduate quizzes and exams will be more in-depth topics. Blogs and discussion questions will be scored on thoughtful content, appropriate length, grammar, and spelling.

Grading The grading scale will be A to F, including some pluses and minuses but no A+, C+, C-, D+, or D-. Grades will be based on the following scale:

96-100% = A

91-95% = A-

88-90% = B+

84-87% = B

81-83% = B-

71-80% = C

61-70% = D

 60% or less = F

 Graduate grading will not include +/-

 90-100% = A

 80 – 89% = B

 70-79% = C

 65-69% = D

 64% or less = F

Note: A Certificate in Biomedical Technology requires at least a “C” grade in this course, plus a total of 15 cr hr BIOMED courses with an average GPA in all BIOMED courses of 3.0.

**COURSE SCHEDULE**

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| --- | --- | --- | --- |
| Date | Topics: undergraduate |  Reading Assignments\* | Points Assignments |
| graduate level: (g) |
| Week 1 | * + 1. Syllabus Quiz, black board and Aperio introduction
		2. Cell and tissue structure
 | SyllabusChapter 1 & 2Masserdotti, 2006Aperio tutorial Tegrity/website | Syllabus Quiz Discussion board  |
| (g) physics of light and microscopy  |
| Week 2 | * + 1. Sample collection, shipping basic stains
		2. Basic patterns: inflammation, hyperplasia, neoplasia
 | Chapter 1 & Chapter 2(g) Chapter 17Tegrity/website | Post on image blog Quiz |
| (g)Special stains |
| Week 3  | 1. Inflammation and tissue injury basics
2. Suppurative inflammation
 | Chapter 2Tegrity/website | Post on image Blog Aperio practice image assignment due |
| (g) Identification of bacterial types  |
| Week 4 | 1. Granulomatous/pyogranulomatous inflammation
2. Eosinophilic inflammation
 | Chapter 2 Chapter3: 32-46Tegrity/website | Inflammation flow chart assignment Quiz |
| (g) prognosis and pathogenesis of infectious disease |
| Week 5 | * + 1. Lymph node – intro and inflammation
		2. Lymphoma
 | Chapter 4: 77-85, 88-104Tegrity/website |  Post on image Blog  |
| (g) ancillary tests: PARR, flow cytometry, CD markers  |
| Week 6 | * + 1. Round cell tumors I
		2. Round cell tumors II
 | Chapter 3: 62-71Tegrity/website  | Quiz  |
| (g) special stains and biologic behavior |
| Week 7 | i. Mesenchymal tumors/Sarcomasii. Tissue reaction with inflammation | Chapter 3: 54-63Tegrity/website  | Post on image Blog |
| (g) immunocytochemistry for sarcomas |
| Week 8 | 1. Epithelial tumors/Carcinomas

ii. Tissue reaction with inflammation | Chapter 3: 46-54Tegrity/website | 1. Exam #1
 |
| (g) immunocytochemistry for carcinomas |
| Week 9 | 1. metastatic lesions – lymph node/lung
2. neuroendocrine tumors
 | Chapter 4: 85-88Tegrity/website | Post on image Blog |
| (g) biological behavior of common tumors; radiology scans |
| Week 10Oct 27-31 | Body cavity fluids* + 1. General classification/collection
		2. Abdominal/ thoracic fluids
 | Chapter 6Tegrity/website | Post on image Blog Quiz  |
| * + 1. (g) chemistry tests on fluids
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| Week 11Nov 3-7 | * + 1. Chylous/FIP and other unique fluids
		2. BAL/TTW and other respiratory cytology
 | Chapter 6(g)Chapter 14: 325-343Chapter 13:309-318Tegrity/website | Mystery fluid assignment |
| (g) CSF, joint fluids |
| Week 12Nov 10-14 | 1. Oral cavity and salivary gland cytology
	* 1. Liver cytology
 | Chapter 7: 193-198Chapter 9Tegrity/website | Quiz Post on image Blog  |
| (g) liver enzyme correlations, prognosis and pathogenesis |
| Week 13Nov 17-21 | 1. Spleen and other internal organs
2. Ear cytology
 | Chapter 4: 104-115Angus, 2004Tegrity/website | Post on image Blog  |
| (g) common tumors and infectious agents of the ear |
| Thanksgiving Break Nov 24-28 |
| Week 14Dec 1-5 | 1. GI and Fecal cytology
2. Quantitative and qualitative fecal floats
 | Chapter 8Tegrity/website | Quiz  |
| (g) life cycles and pathogenesis |
| Week 15Dec 8-12 | 1. Reproductive/ mammary cytology
2. Estrus of the bitch
 | Chapter 12Tegrity/website | Image portfolio |
| (g) hormone level correlation and detection of pregnancy |
| Finals weekDec 15-17 | Exam will open Dec 15-17.  |  | Exam #2  |
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Graduate reading list - tentative:

Masserdotti, C. (2006), Architectural patterns in cytology: correlation with histology. Veterinary Clinical Pathology, 35: 388–396.

Angus, Otic cytology in health and disease, Veterinary Clinics of North America: Small Animal Practice, Volume 34, Issue 2, March 2004, Pages 411-42