Course Title	Canine Tumor Research
Course #	39OR
Credit Hours	2 This 2 credit class requires 3 hours per week of formal laboratory instruction, plus 3 additional hours of student work per week a 15-week semester, for a total of 90 hours.
Semester	Fall and Spring
Prerequisites	ANIMLSCI 103 OR ANIMLSCI 115 AND BIOL 151
Class Meetings	Three laboratory sections will be offered: Wednesdays 8:00 am – 11:00 am, Thursdays 8:30 am – 11:30 am, and Fridays 8:00 am – 11:00 am Students will register for one of the three sections, and devote an additional 3 hours per week to the following as needed: maintenance of cell cultures, outreach to veterinarians and pet owners, maintenance of the data bank, and data analysis.
Textbook	None

INSTRUCTOR INFORMATION

Instructor	Kathleen Arcaro
Office Location	LSL N529
Office Hours	Tuesday and Thursday 3 to 4 pm or by appointment
E-Mail Address	karcaro@umass.edu

COURSE DESCRIPTION AND LEARNING OBJECTIVES

Course Description	This laboratory course is an introduction to mammalian cell culture techniques in the context of conducting basic research with primary canine tumors and an established canine mammary cell line. Topics include etiology of canine mammary and mast cell cancers, canine mammary cancer as a model for human breast cancer, development of patient-derived xenografts, and immunohistochemistry.
Student Learning Objectives	Students will be expected to: 1) Master basic mammalian cell culture techniques including thawing, maintaining, expanding, and freezing adherent canine cell culture lines. 2) Demonstrate proficiency using inverted and upright microscopes with phase contrast optics to observe and photograph cell cultures. 3) Demonstrate proficiency in preparing single-cell suspensions, counting cells with a hemocytometer, and making appropriate cell dilutions for experimental protocols. 4) Maintain basic equipment in a cell culture laboratory including biosafety cabinets, CO_2 incubators, centrifuges, and liquid nitrogen storage vessels. 5) Process fresh canine tumors upon arrival at the lab including proper archiving of sections for future extraction of nucleic acids, immunohistochemistry, and patient-derived xenografts, as well as preparing primary cell cultures. Most importantly, students will be expected to demonstrate an understanding of the

	principles underlying the techniques and protocols that they have mastered, and thereby be able to troubleshoot potential problems; both real and theoretical.
Grading	5 In-class quizzes 35% Weekly update in form of a PPT 30% Final exam 35% Total 100% 94%-100%=A 90%-93.99%=A- 87-89.99%=B+ 84-86.99%=B 81-83.99%=B- 78-80.99%=C+ 75-77.99%=C 72-74.99%=C- 69-71.99%=D+ 66-68.99%=D 63-65.99%=F
Class Schedule 1 2 3 4 5 6 7 8 9 10 11 12 13	Topic (Basic techniques will be practiced throughout the semester and each 3-hour class will also have a brief lecture.) • Basic sterile mammalian cell culture • Preparing single-cell suspensions, dilutions • Data base for longitudinal study design (REDCap) • Primary versus established cell lines • Preparing culture media; autoclaving and filter sterilization • Patient-derived xenografts • Sample archiving and data bases • Tissue fixation & embedding • Immunohistochemistry • Triple-negative breast and mammary cancers • Inflammatory breast and mammary cancers • Database analysis
Required readings	1) Queiroga, Felisbina Luisa, et al. "Canine mammary tumours as a model to study human breast cancer: most recent findings." *in vivo* 25.3 (2011): 455-465. 2) Goldschmidt, M., et al. "Classification and grading of canine mammary tumors." *Veterinary pathology* 48.1 (2011): 117-131. 3) Salas, Yaritza, et al. "Epidemiological study of mammary tumors in female dogs diagnosed during the period 2002-2012: A growing animal health problem." *PloS one* 10.5 (2015): e0127381. 4) Gentile, Luciana B., et al. "Establishment of primary mixed cell cultures from spontaneous canine mammary tumors: Characterization of classic and new cancer-associated molecules." *PloS one* 12.9 (2017): e0184228.

UMass Amherst Academic Regulations	All undergraduate students are responsible for complying with the academic regulations at the following link: https://www.umass.edu/registrar/students/policies-and-practices/academic-regulations The UMass Amherst policy on class attendance is: "Students are expected to attend all regularly scheduled classes at the University for which they are registered. Students absent due to extenuating circumstances-including jury duty, military obligations, scheduled activities for other classes, the death of a family member, or verifiable health-related incapacity-remain responsible for meeting all class requirements and contacting the faculty member in a timely fashion about making up missed work. Faculty shall offer such students reasonable assistance in making up missed classes."
Accommodation	The University of Massachusetts Amherst is committed to providing an equal educational opportunity for all students. If you have a documented physical, psychological, or learning disability on file with Disability Services (DS), you may be eligible for reasonable academic accommodations to help you succeed in this course. If you have a documented disability that requires an accommodation, please notify me within the first two weeks of the semester so that we may make appropriate arrangements.
Academic Honesty	Since the integrity of the academic enterprise of any institution of higher education requires honesty in scholarship and research, academic honesty is required of all students at the University of Massachusetts Amherst. Academic dishonesty is prohibited in all programs of the University. Academic dishonesty includes but is not limited to: cheating, fabrication, plagiarism, and facilitating dishonesty. Appropriate sanctions may be imposed on any student who has committed an act of academic dishonesty. Instructors should take reasonable steps to address academic misconduct. Any person who has reason to believe that a student has committed academic dishonesty should bring such information to the attention of the appropriate course instructor as soon as possible. Instances of academic dishonesty not related to a specific course should be brought to the attention of the appropriate department Head or Chair. Since students are expected to be familiar with this policy and the commonly accepted standards of academic integrity, ignorance of such standards is not normally sufficient evidence of lack of intent (http://www.umass.edu/dean_students/codeofconduct/acadhonesty/).
Ownership of course material	Many of the materials created for this course are the intellectual property of the instructor. This includes, but is not limited to, the syllabus, lectures, problem sets, exams, study guides, and course notes. Except to the extent not protected by copyright law, any use, distribution or sale of such materials requires the written permission of the instructor. Please be aware that it is a violation of university policy to reproduce, for distribution or sale, course material including the syllabus, lectures, problem sets, exams, study guides, and course notes.