

Course Bulletin

001188	Pathology Mentor
Subject: VET	Catalog Nbr: 1188

133789	Animals and Society I
Subject: APP	Catalog Nbr: 501
2021 FALL	Primary Erin King
Erin.KingDVM@tufts.edu	
<p>Animals in Society uses lectures, discussions and assignments to survey contemporary issues regarding animals and how those issues play out in public policy and community practices toward animals. This is done through a series of modules that examine the historical, social, ethical, political, legal, legislative and economic aspects of society's relationship to recognized categories of animals. The first module of Animals & Society I comprises an introduction to ethics, law, science, social marketing, and policy-making; this year, the second module focuses on wildlife and wildlife policy.</p>	

133807	Animals and Society II
Subject: APP	Catalog Nbr: 502
<p>Animals in Society II is centered around modules on farm animals, companion animals and the use of animals in research. Additional context is provided in the form of class sessions on humane education and the role of animals in literature and art.</p>	

133997	Public Policy Analysis
Subject: APP	Catalog Nbr: 509
2023 SPRG	Primary Jennifer Jackman
jennifer.jackman@tufts.edu	
<p>This course focuses on the theories, analytical approaches and techniques of public policy analysis and provides students with an opportunity to critically examine theoretical frameworks in the context of animal policy. The course will explore policy process, elements of policy design, and the relationship between social movements and political institutions. Through in-depth research in animal policy areas of interest to them, students will gain skills in policy analysis and familiarity with research resources, including laws, regulations, legislation, lobbying reports, and campaign finance records. For the course, students will write a policy analysis case study and policy memos among other assignments.</p>	

134234	Elective
Subject: VET	Catalog Nbr: 521

Course Bulletin

134248	Elective		
Subject:	Catalog Nbr:		
VET	522		

134328	Intro to Lab Anml Med		
Subject:	Catalog Nbr:		
LAM	551		
<p>This course is an introduction to the use of animals in biomedical research and the role of the laboratory animal veterinarian. In the first half of the course, presentations from experts in the field cover regulatory control of research animal use, the role of the Institutional Animal Care and Use Committee (IACUC), animal models in biomedical research, and ethical use of animals. A laboratory animal anatomy module includes a dissection lab devoted to anatomy of chickens and frogs. The second half of the course covers the biology and care of research animals and design of research animal facilities. The class tours several rodent housing and mixed species research facilities in the area.</p> <p>Students are expected to attend all classes, labs, and tours. They are required to write one analysis paper on research animal ethical cases and to work in groups to create a design for a multi-species research animal facility. Two written assignments are required. Cross listed with PhD course: BMS 657</p>			

134376	Surgery and Anesthesiology In Research Facilities & Journal Club			
Subject:	Catalog Nbr:			
LAM	556			
2022 FALL	Primary	Angeline Warner	angie.warner@tufts.edu	
2022 FALL	Primary	David Lee-Parritz	david.lee-parritz@tufts.edu	
<p>This course provides students with additional training in anesthesia and surgery methods relevant to the laboratory animal setting. The first portion of the course focuses on principles of anesthesia in laboratory animals and common procedures in rodents. Practical laboratories provide an opportunity for the students to gain hands-on experience in appropriate restraint and handling techniques as well as practice common procedures such as injections, oral administration of compounds, catheter placement and blood collection in rodents. Pain assessment, analgesic management, determination of humane endpoints and methods of euthanasia are also covered. Principles of aseptic surgery in research facilities and post-operative care are emphasized. Students also have an opportunity to practice routine dentistry in Cummings School teaching dogs. This course includes two journal club sessions led by laboratory animal veterinarians or residents in training programs. Journal clubs introduce contemporary topics in the literature and foster critical reading of new research reports.</p>				

134393	Specialized Research Environments & Journal Club		
Subject:	Catalog Nbr:		
LAM	557		

Course Bulletin

2023 SPRG	Primary	Angeline Warner	angie.warner@tufts.edu
2023 SPRG	Primary	David Lee-Parritz	david.lee-parritz@tufts.edu
<p>This course provides advanced instruction in topics relating to specialized environments which are of particular concern to the laboratory animal veterinarian. The course primarily consists of didactic presentations and discussions led by specialists in the field on a broad variety of topics including zoonotic diseases, occupational health and safety programs, and biocontainment facility design and disaster planning. Other subjects include: transgenic technology, behavioral studies and imaging technologies such as ultrasound, magnetic resonance imaging (MRI) and computed tomography (CT). The course consists of didactic lectures, case studies, and facility tours which are designed to integrate the material discussed in lectures. This course includes two journal club sessions led by laboratory animal veterinarians or residents in training programs. Journal clubs introduce contemporary topics in the literature and foster critical reading of new research reports.</p>			

134409	Applied Learning Experience: Animal Facility Experience		
Subject:	Catalog Nbr:		
LAM	558		
<p>The summer Animal Facility Experience consists of 8 weeks of in-depth training experiences at industry or academic laboratory animal facilities during the first or second summer after matriculation into the program. The focus of this experience should be on clinical laboratory animal medicine, husbandry, regulatory compliance, or facility management. With advance approval of the program director, equivalent full-time work experience acquired before matriculation may substitute for LAM 558 or 559, but not both. Work undertaken to satisfy undergraduate course requirements will typically not qualify for exemption.</p>			

134470	Research: Planning and Techniques (mentor)		
Subject:	Catalog Nbr:		
CBS	561		
<p>Students spend the majority of their training time working in the laboratory, conducting research studies relevant to their research project. Data is analyzed and interpreted in light of the test hypotheses. One objective of the research is to have students present their findings at scientific meetings and prepare their studies for publication</p>			

134488	Fundamentals of Animal Research-Biostatistics		
Subject:	Catalog Nbr:		
CBS	570		
<p>This is an elementary course in statistics, designed to give an overview of the basics of statistical analyses, including probability theory, distributions, and hypothesis testing. It is a core course in the graduate curriculum, and as such the prerequisites are those for entry into the graduate program. Topics to be covered include probability and sampling theory, frequency distributions, and hypothesis testing. Some hands-on exercises using statistical software are also offered, but it is anticipated that more advanced applications will require additional instruction. It is the instructor's objective to familiarize students with central concepts and to save in depth discussion of methodologies for advanced courses, however when it is practical, students are encouraged to suggest topics for discussion and review.</p>			

Course Bulletin

134520	Fundamentals of Animal Research II: Research Ethics
Subject: CBS	Catalog Nbr: 571
<p>The aim of the course is to discuss acceptable, unacceptable and controversial aspects of research ethics and responsibilities of a researcher. Students enrolled in the course participate in the discussions of topics using a case-based approach. The course topics include: (1) Experimental techniques and the treatment of data, (2) Conflict of interest, (3) Publication policies and openness in research, (4) Allocation of credits and authorship practices, (5) Error and negligence in science, (6) Misconduct in science, and (7) Responding to violations of ethical standards. The course meets weekly for 2 hours during November-December.</p>	

134537	Journal Club/Seminars
Subject: CBS	Catalog Nbr: 572
<p>The emphasis is on critical analysis, identifying the reasons that the research is significant, and understanding how the findings extend current knowledge. Students take this course both semesters of the MS program and give presentations each semester. In addition, students are required to attend department seminar series. These seminars take place throughout the year and are part of the training experience, providing an opportunity to develop communication skills and present ideas.</p>	

134568	Lab Meetings
Subject: CBS	Catalog Nbr: 573
<p>All students will attend and participate in weekly laboratory meetings scheduled by their mentor or research groups. Students are expected to present plans or results of projects to laboratory members at these meetings.</p>	

134584	Readings In Special Topics
Subject: CBS	Catalog Nbr: 574
<p>This course focuses on important topics within the field of research study. Each student meets weekly with their mentor to discuss relevant research papers in their area of study.</p>	

134599	Research
Subject: CBS	Catalog Nbr: 575
<p>Students spend the majority of their training time working in the laboratory, conducting research studies relevant to their research project. Data is analyzed and interpreted in light of the test hypotheses. One objective of the research is to have students present their findings at scientific meetings and prepare their</p>	

Course Bulletin

studies for publication.

134612	Thesis Preparation
Subject: CBS	Catalog Nbr: 576
<p>Students in the DVM/MS-CBS program must complete a thesis and write their thesis during June and July and defend it orally by August 15. Students in the DVM/MS-CBS program must complete a thesis. The thesis must contain a title page that includes the project title, the student's name, the names of the mentor, and members of the advisory committee, a statement that the thesis is submitted in partial fulfillment of the requirement for a Master of Science in Comparative Biomedical Sciences, and the month and year of submission. The thesis itself must consist of an abstract of the project (one page), a general introduction to the research problem within the field of study (current and pertinent references should be included in this section), and a body of the thesis that consists of specific experiments, methods, results, a general discussion that relates the experimental finding to existing literature and the state of the field, references, and acknowledgement. Submitted or published work can be included as a component of the body of the thesis.</p> <p>The thesis should be submitted in final form to the thesis examination committee a minimum of 2 weeks prior to the thesis defense. The Thesis Examination Committee consists of the student's SAC plus one outside examiner (Tufts program faculty or faculty from another academic institution). The name of the outside examiner is submitted to the program director for approval at least one month prior to the scheduled thesis defense. The thesis defense should occur in July or early August in time to permit any final revisions. The Thesis Examination Committee can approve the thesis as is, approve it with revisions, or reject the thesis. It must then be approved by the Advanced Education Committee (AEC). Two copies of the final version of the approved thesis are submitted to the program director by August 15.</p>	

134641	Thesis Preparation (mentor)
Subject: CBS	Catalog Nbr: 579
<p>The resident trainees will have an extended period in which to complete and defend their theses. Specifically, during the first year of training, the residents will complete all required course work as required in this MS program except that the research credits and participation will be reduced to a single credit commensurate with the trainee's efforts. At the end of the first year, residents will participate in a research planning and techniques seminar (1 credit) offered by the mentor and related faculty. Research will be conducted for a total of 8 months during the first and second year of residency to fulfill the thesis research requirements, VET 560 and VET 561. The candidate is expected to devote two months during year 1 defining their research project and acquiring relevant laboratory techniques needed for the proposed research. During year 2 the candidate would conduct full-time research from January through June.</p>	

134656	Ecology & Conservation Biology
Subject: MCM	Catalog Nbr: 580

Course Bulletin

2022 FALL	Primary	Alison Robbins	alison.robbins@tufts.edu
<p>The concept that the health of the environment influences the health of humans and animals means that all practitioners of conservation medicine must understand fundamental principles of ecology and conservation biology. This course will ensure all students possess foundational knowledge, including: an understanding of ecosystems, community, population ecology, demography, population genetics, population viability and conservation of biodiversity.</p>			

134669	Health, Disease and Environment		
Subject: MCM	Catalog Nbr: 581	2022 FALL	Primary
	Christopher Whittier	chris.whittier@tufts.edu	
<p>In this course, students will acquire a basic understanding of disease mechanisms, host defenses against disease, the role of vectors in spreading and maintaining disease, and basic principles of disease ecology. This class will also review the diseases of major concern for conservation medicine and ecosystem health. Emphasis will be placed on the integration of animal, human, and environmental health, and the environmental, economic, and anthropogenic factors promoting the emergence or persistence of infectious diseases and other major health threats.</p>			

134683	Research Skills I - Systematic Review and Analysis		
Subject: MCM	Catalog Nbr: 582	2022 FALL	Primary
	Jessica Sparks	Jessica.Sparks@tufts.edu	
<p>Research Skills I will guide students through the process of conducting and writing a thorough and rigorous critical literature review of an interdisciplinary conservation medicine topic of interest to them. Students will learn how to access, organize, analyze, interpret, critique, and communicate data and findings from existing sources of published research. The course's second half will focus on using literature reviews to inform research question and hypothesis development, study designs, and data collection methods. While this course will be unable to explore the multitude of available research methodologies in-depth, it is intended to provide you with an understanding of the breadth of methods available. Since you are expected to be identifying and reading research papers relevant to your selected interdisciplinary conservation medicine problem each week, required course readings will be limited. You may be called upon in class to provide informal updates on your literature search and review in discussions and group activities. Assignments are intended to aid you in beginning to conceptualize and research your case study topic. Each week will include up to six hours of contact time involving didactic presentations, critiques of published research, in-class group activities, individual assignments, and presentations.</p>			

134695	Field and Laboratory Techniques		
Subject: MCM	Catalog Nbr: 583	2022 FALL	Primary
	Alison Robbins	alison.robbins@tufts.edu	
<p>Conservation medicine requires empirical health assessments of individuals and populations. Through this course students will become familiar with commonly used field and laboratory methods. This hands-on course</p>			

Course Bulletin

covers methods for estimating the size of populations, sample collection and handling, field capture, restraint and anesthesia (including animal welfare considerations). In addition, student will participate in practical session on laboratory diagnostics and commonly used laboratory research techniques (including PCR, ELISA, microarrays and applications of molecular genetics).

134710	Journal Club		
	Subject:	Catalog Nbr:	
	MCM	584	
<p>Journal club will familiarize students with topical scientific papers relevant to conservation medicine, help students become conversant in the language of different contributing disciplines and enhance the skills of analytical reading and critique. Papers will be coordinated with course material. Students take Journal Club in both the Fall and Spring semesters.</p>			

134723	Case Study		
	Subject:	Catalog Nbr:	
	MCM	585	
<p>The case study will provide a capstone exercise that builds on a student's knowledge and skills to produce a comprehensive conservation medicine analysis of a current health problem and recommend strategies to address identified challenges. Each student will identify an issue and will be charged with leading a collaborative team involving other students and appropriate faculty. Cases will undergo a peer-review evaluation through our network of conservation medicine partners. At the end of the year, case studies will be compiled and submitted for publication. Students register for the Case Study during the fall and spring semesters, and are expected to complete their Case Study during the summer</p>			

134736	Human Dimensions of Conservation Medicine			
	Subject:	Catalog Nbr:		
	MCM	586		
	2023 SPRG	Primary	Felicia Nutter	Felicia.Nutter@tufts.edu
<p>Human political, economic, and cultural considerations help create the conditions that govern animal, human, and environmental health, and establish the context in which conservation medicine solutions are implemented. This course will examine the roles of economics, local, national and international governmental regulations, treaties and policies. It will also explore the influences that communities and local culture have on agriculture, trade, conservation, environment, land use, and public health.</p>				

134750	Engineered Solutions		
	Subject:	Catalog Nbr:	
	MCM	587	
<p>Innovation and applied technology will play an increasingly significant role in developing sustainable solutions for many conservation medicine issues. Conservation professionals need to understand the options and potential of engineered solutions in both natural and built environments. In this course students will work</p>			

Course Bulletin

within the context of systems engineering as a basis for problem solving. Applied topics will include: ecological engineering, hydrology, remote sensing (satellite, biological and chemical), engineered natural systems and environmental impact assessment methodologies.

134762	Research Skills II - Surveillance Methods and Techniques			
Subject:	Catalog Nbr:			
MCM	588			
2023 SPRG	Primary	Christopher Whittier	chris.whittier@tufts.edu	
<p>This course will familiarize students with methods for collecting data on health events, disease incidence and prevalence, including participatory methodologies. Students will be introduced to modeling of disease dynamics and processes and disease mapping using GIS technologies. Students will also acquire familiarity with the use of telemetry for monitoring wildlife populations, and the analysis of wildlife data using GPS and GIS and emerging web-based technologies such as Google Earth.</p>				

134777	Project Management And Communication			
Subject:	Catalog Nbr:			
MCM	589			
2023 SPRG	Primary	Jessica Sparks	Jessica.Sparks@tufts.edu	
<p>This course will cover important communication skills that will enhance collaboration and dissemination of information to stakeholders (scientific community, public and government agencies) as well as the practical skills needed to initiate, fund, and manage research projects. Style and strategies for publication in scientific and lay journals, delivery of legislative briefings, and use of other media will be explored. Project development topics will include team building, seeking funders, grant writing, project development and management, and program and policy evaluation. Sessions on collaborative writing, data visualization, team management and leadership will be included.</p>				

134789	Journal Club/Seminar			
Subject:	Catalog Nbr:			
LAM	592			
<p>Students, along with faculty members, participate in a monthly journal club for discussion of current literature in the field. The emphasis is on critical analysis, identifying significance of the research, and understanding how the findings extend current knowledge.</p>				

134829	Research			
Subject:	Catalog Nbr:			
BMS	603			
<p>Guided research on a topic suitable for a doctoral dissertation.</p>				

134842	Research			
---------------	-----------------	--	--	--

Course Bulletin

Subject: Catalog Nbr:
BMS 604
Guided research on a topic suitable for a doctoral dissertation.

134869	Research
Subject: Catalog Nbr:	
BMS 605	
Guided research on a topic suitable for a doctoral dissertation.	

134897	Journal Club and Seminar Series
Subject: Catalog Nbr:	
BMS 607	
<p>Students, post-doctoral fellows, scientific staff, and faculty members participate in a weekly Journal Club and regular seminars. The emphasis in Journal Club is on critical analysis of the data and how the research extends current knowledge. Seminars include both campus Work-in-Progress presentations and research presentations given by scientists from the campus or invited from outside. Students take this course throughout their PhD program and are required to regularly attend both Journal Club and seminars. In addition students lead Journal Club twice per year and present one Work-in-Progress seminar per year beginning in the second year.</p>	

134912	Research
Subject: Catalog Nbr:	
BMS 608	
Guided research on a topic suitable for a doctoral Dissertation.	

134940	Research
Subject: Catalog Nbr:	
VET 616	

134982	Parasite Biology
Subject: Catalog Nbr:	
BMS 652	
<p>Parasites are extraordinarily pervasive. This graduate course explores globally important parasites including hookworms, tapeworms, blood flukes, and those that cause malaria, sleeping sickness, and Chagas' disease. Students examine the morphology, development, and distribution of these pathogens and consider the mechanisms they use to infect their hosts and survive within. Topics include the mechanisms of infection and immunity, intracellular survival strategies, vector biology, drug resistance, vaccines, and the economics and public health impact of parasitic disease. Each class centers on interactive discussions and an examination of</p>	

Course Bulletin

the primary scientific literature.
Course offered every other year.

134998	Fundamentals of Animal Research I: Biostatistics
Subject: BMS	Catalog Nbr: 653
<p>Basic statistics will be taught using an active approach, emphasizing practical applications of statistical concepts such as hypothesis testing, sampling and, statistical inference. Students will gain experience in analyzing data sets and presenting data. In addition, students will become familiar with using Excel for basic statistical analyses and more specialized programs for more advanced statistics. It is the instructor's objective to familiarize students with central concepts and to save in depth discussion of methodologies for advanced courses, however when it is practical, students are encouraged to suggest topics for discussion and review. Laptop computers are required.</p>	

135016	Fundamental Of Animal Research II: Ethics
Subject: BMS	Catalog Nbr: 654
<p>The aim of the course is to discuss acceptable, unacceptable and controversial aspects of research ethics and responsibilities of a researcher. Students enrolled in the course participate in the discussions of topics using a case-based approach. The course topics include: (1) Experimental techniques and the treatment of data; (2) Conflict of interest; (3) Publication and openness; (4) Allocation of credit and authorship practices; (5) Error and negligence in science; (6) Misconduct in science; (7) Use of animals in research; and (8) Responding to violations of ethical standards. The course meets weekly for 2 hours during November-December.</p>	

135033	Epidemiology of Zoonotic Infections
Subject: BMS	Catalog Nbr: 655
<p>This course seeks to provide health professionals with the basis for evaluating risks and formulating prevention and intervention strategies for outbreaks or endemic transmission of zoonotic infections. Each session is structured with a "vertical" component comprising general principles, and a "horizontal" component comprising a case study of a specific agent that illustrates the general principles. Course offered every other year</p>	

135049	Advanced Molecular Biology
Subject: BMS	Catalog Nbr: 656
<p>This course introduces students to molecular biology of both prokaryotes and eukaryotes including (1) DNA replication, repair, and recombination; (2) Bacterial genetics; (3) Chromosome structure and function; (4) Protein biosynthesis and transportation; and (5) Phages and viruses. Course offered every other year.</p>	

Course Bulletin

135081	Introduction to Lab Animal Medicine
Subject: BMS	Catalog Nbr: 657
<p>This course is an introduction to the use of animals in biomedical research and the role of the laboratory animal veterinarian. In the first half of the course, presentations from experts in the field cover regulatory control of research animal use, the role of the Institutional Animal Care and Use Committee (IACUC), animal models in biomedical research, and ethical use of animals. A laboratory animal anatomy module includes three dissection labs devoted to anatomy of rodents, lagomorphs, hamsters, ferrets, and gerbils. The second half of the course is focused on care of research animals and design of research animal facilities. The class will tour a barrier rodent housing facility, a rodent facility using robotic technology, and a primate facility. Students are expected to attend all classes, labs, and tours. They will be required to write one analysis paper on research animal ethical cases and to work in groups to create a design for a multi-species research animal facility. The class holds a mock IACUC meeting. Same basic course as MS-LAM course 551</p>	

135123	Principles of Biodefense
Subject: BMS	Catalog Nbr: 659
<p>The recent increase in terrorist attacks in many parts of the world has focused attention on the possibility that pathogens and toxins may be used as weapons targeting humans or economically important animals and plants. The issues surrounding bioterrorism and its critical complement, biodefense, are complex and require an understanding of sociopolitical factors as well as those of biology. This course seeks to provide the basis for (1) evaluating the risks associated with bioterrorism and (2) developing strategies for defending against as well as responding to the illegitimate use of biological agents. Each of the sessions are structured into a didactic introductory, "horizontal" hour designed to explore general concepts, with the second hour dedicated to a "vertical" participatory discussion: specific case studies or literature review of the biology and other issues related to specific agents that illustrate important aspects of the horizontal topics. The grade for the course is determined by class participation and a term paper. Course offered every other year</p>	

135181	Molecular & Cellular Biology-Umass Bbs-821
Subject: VET	Catalog Nbr: 698

138644	Transfer Credit
Subject: TRAN	Catalog Nbr: 9999

Course Bulletin

138660	Toxicological Pathology		
Subject: BMS	Catalog Nbr: 609		
<p>Focuses on toxicant/drug-induced pathophysiology and histopathological responses of the cardiovascular, pulmonary, gastrointestinal, renal, neurological, musculoskeletal, immune, endocrine and reproductive systems in animals. The course integrates into each organ system studied a review of standard techniques used in toxicity studies including principles of Good Laboratory Practices (GLP), the use of animal necropsy, histology/pathology, various tissue molecular biological techniques, methods in evaluating or testing lesions, genetics of rodent strains, and transgenic mice. Special emphasis is placed on mechanisms of action, defining histopathologic changes of significance compared to common background/incidental lesions, and the use of nomenclature, data bases and statistical analysis in overall interpretation of histopathology studies. (Course offered every other year.</p>			

138661	Externship		
Subject: MCM	Catalog Nbr: 590		
<p>Students will have the opportunity to immerse themselves in conservation medicine work in a wide variety of settings for four weeks during the program year. The preceptorship will provide students with insight into how conservation medicine issues are addressed and how interdisciplinary approaches can be applied in a real world setting. Students will be able to select from field experiences, clinical experiences, analytical experiences, laboratory-focused experiences, and project management or policy experiences. The preceptorship will be completed either during the winter break or summer semester, depending upon the opportunity.</p>			

138669	Preventive Medicine in Research Animal Facilities & Journal Club			
Subject: LAM	Catalog Nbr: 553			
	2021 FALL	Primary	Phyllis Mann	phyllis.mann@tufts.edu
	2022 FALL	Primary	Angeline Warner	angie.warner@tufts.edu
	2022 FALL	Primary	David Lee-Parritz	david.lee-parritz@tufts.edu
<p>This course complements the second year of the veterinary curriculum which is mainly concerned with the pathophysiology of disease. The course begins with a series of classes in the application of medical statistics to animal research. The class supplements the introductory exposure to statistics and epidemiology in the professional DVM program with specific emphasis on the design and interpretation of research studies using animals. The second half of the courses focuses on viral, bacterial and parasitic pathogens of concern in rodents used in research. The course provides instruction in the diagnosis, treatment, control and prevention of disease in the laboratory animal facility. The development and implementation of health surveillance and preventative health programs in a laboratory animal setting is discussed. This course consists of didactic lectures and tutorial sessions with assigned readings, case studies and interactive discussions. This course includes two journal club sessions led by laboratory animal veterinarians or residents in training programs. Journal clubs introduce contemporary topics in the literature and foster critical reading of new research reports.</p>				

Course Bulletin

138670	Laboratory Animal Medicine and Pathology			
Subject: LAM	Catalog Nbr: 555			
2023 SPRG	Primary	Sherry Castonguay	sherry.castonguay@tufts.edu	
2023 SPRG	Primary	Angeline Warner	angie.warner@tufts.edu	
2023 SPRG	Primary	Scott Perkins	scott.perkins@tufts.edu	
2023 SPRG	Primary	Corinna Beale	Corinna.Beale@tufts.edu	
2023 SPRG	Primary	Kimberly Gaspie	Kimberly.Gaspie@tufts.edu	
2023 SPRG	Primary	Jacqueline Fremont-Rahl	Jacqueline.Fremont_Rahl@tufts.edu	
2023 SPRG	Primary	David Lee-Parritz	david.lee-parritz@tufts.edu	
2023 SPRG	Primary	Susanna Kurnick	Susanna.Kurnick@tufts.edu	
2023 SPRG	Primary	Samer Jaber	Samer.Jaber@tufts.edu	
2023 SPRG	Primary	Donna Jarrell	Donna.Jarrell@tufts.edu	
<p>This course is designed to complement the third year of the veterinary curriculum which integrates the pathophysiological aspects of disease with a comprehensive discussion of the presenting clinical signs, diagnostic criteria, and the treatment of these entities. The lectures provided in this course are designed to provide students with a sound basis in clinical laboratory animal medicine with emphasis on diagnosis, prognosis, and management. A rodent surgery laboratory is offered at Charles River Labs in which students gain practical experience in rodent surgical methods by performing common procedures such as splenectomy, adrenalectomy, ovariectomy, embryo transfer, ovarian transplant and jugular vein cannulation.</p>				
138673	Toxicological Pathology			
Subject: VET	Catalog Nbr: 609			
139123	Parasite Biology			
Subject: MCM	Catalog Nbr: 1001			
139212	Journal Club/Seminar			
Subject: VET	Catalog Nbr: 592			
<p>Students, along with faculty members, participate in a monthly journal club for discussion of current literature in the field. The emphasis is on critical analysis, identifying significance of the research, and understanding how the findings extend current knowledge.</p>				
139232	Animal Law			

Course Bulletin

Subject: Catalog Nbr:
APP 1001

Until recently, animals were treated as nothing more than property in courts of law. In this course, students explore how the changing status of animals is (or might be) reflected in case law, as well as the implications of specific state and federal laws (such as animal cruelty laws, the Animal Welfare Act, and the Endangered Species Act) for the legal status of animals.

139235	Applied Learning Experience: Animal Facility
---------------	---

Subject:	Catalog Nbr:
VET	550

139236	Laboratory Animal Medicine and Pathology & Journal Club
---------------	--

Subject:	Catalog Nbr:
LAM	555

This course complements the third year of the veterinary curriculum which integrates the pathophysiological aspects of disease with a comprehensive discussion of the presenting clinical signs, diagnostic criteria, and the treatment of these entities. The lectures provided in this course are designed to provide students with a sound basis in clinical laboratory animal medicine with emphasis on diagnosis, prognosis, and management. Experimental surgery laboratories allow students to gain practical experience in swine and rabbit surgical methods by performing common procedures such as jugular vein cannulation. This course includes one journal club session led by laboratory animal veterinarians or residents in training programs. Journal clubs introduce contemporary topics in the literature and foster critical reading of new research reports.

139237	Applied Learning Experience-Research Facility
---------------	--

Subject:	Catalog Nbr:
VET	554

139244	Research
---------------	-----------------

Subject:	Catalog Nbr:
BMS	616

Guided research on a topic suitable for a doctoral Dissertation.

139245	Applied Learning Experience: Research Experience
---------------	---

Subject:	Catalog Nbr:
LAM	559

The summer Research Experience consists of an 8-week research experience involving animals. The focus of this experience should be significant participation in a research project using laboratory animals, including

Course Bulletin

exposure to experimental design, collection of data, and interpretation of results. With advance approval of the program director, equivalent full-time work experience acquired before matriculation may substitute for LAM 558 or 559, but not both. Work undertaken to satisfy undergraduate course requirements will typically not qualify for exemption.

139249	JAX-Mammalian Genetics
Subject: BMS	Catalog Nbr: 1001
In collaboration with Jackson Laboratories, TCSVM is offering a live video presentation of a series of topics on Mammalian Genetics. Faculty as well as graduate students have the opportunity to refresh/learn mammalian genetics.	

139261	UMass-Principles of Light & Electron Microscopy
Subject: BMS	Catalog Nbr: 1003

139264	Understanding Human Psychopathology
Subject: VET	Catalog Nbr: 514

139265	Disruption of Cellular Architecture and Human disease
Subject: CRUM	Catalog Nbr: 788

139481	Shelter Visitations
Subject: APP	Catalog Nbr: 1002
<p>This elective is designed for students with a special interest in shelter medicine. The sessions will be divided as follows:</p> <p>Session 1: (2 hours) meet with Dr. McCobb to discuss semester goals and prepare list of locations to visit. The selected locations can be determined by the student's interests and by ease of travel. In addition, we will review a list of goals/questions to be answered by the student at each visit site.</p> <p>Visits: students will visit 4 animal shelters in the New England area. For each shelter they will prepare a five page report summarizing the goals and questions that we discussed. Students should also write a conclusion report (of at least pages) summarizing comparisons between the different places that they visited.</p> <p>Wrap up Session: (2 hours) the student will meet with Dr. McCobb again to discuss the shelter visits and what</p>	

Course Bulletin

was learned.

139482	Farm Animal Welfare
Subject: APP	Catalog Nbr: 1003

139483	Wildlife Rehabilitation
Subject: APP	Catalog Nbr: 1004

139484	Community Cat Clinics
Subject: APP	Catalog Nbr: 1005
<p>Students may receive elective credit for participating in a variety of community-service oriented activities, including animal shelter visitation, community cat clinics, support for the Tufts at Tech Community Veterinary Clinic, Tufts Paws for People, and the Tufts Pet Loss Hotline. Academic exercises matched to the service activities help illuminate the policy and practice context of the students' work.</p>	

139601	GIS for Natural Resources and Conservation Application
Subject: MCM	Catalog Nbr: 1002

139857	Humanitarian Studies In The Field
Subject: MCM	Catalog Nbr: 1003
<p>This course will offer a practical and in-depth analysis of the complex issues and skills needed to engage in humanitarian work in field settings. Through presentations offered by the faculty of the Humanitarian Studies Initiative and guest speakers who are experts in their topic areas, students will gain familiarity with the primary frameworks in the humanitarian field (human rights, livelihoods, Sphere standards, international humanitarian law) and will focus on practical issues that arise in the field, such as rapid public health assessments, field cluster sampling techniques, application of minimum standards for food security, and operational approaches to relations with the military in humanitarian settings.</p>	

139893	Molecular and Cellular Immunology
Subject:	Catalog Nbr:

Course Bulletin

BMS 1004

This course is offered through the University of Massachusetts Medical School.

139894 **Advanced Epidemiology and Research Methods**

Subject: Catalog Nbr:
BMS 1005

This course is offered through the University of Massachusetts Medical School.

139895 **Cell and Molecular Genetics**

Subject: Catalog Nbr:
BMS 1006

This course is offered through the University of Massachusetts Medical School.

139904 **Introduction to Clinical Epidemiology**

Subject: Catalog Nbr:
BMS 1007

This course taken through the University of Massachusetts Medical School.

139964 **Understanding Human Psychopathology**

Subject: Catalog Nbr:
APP 1006

139965 **Wildlife in Captivity**

Subject: Catalog Nbr:
APP 1007

This lecture/discussion class examines the ethical, welfare, health, conservation, and policy issues surrounding the keeping of wildlife in captivity. Particular attention is paid to wildlife in zoos and aquariums, but wild animals in sanctuaries, backyards, research facilities, circuses, and other forms of entertainment also receive attention. The course features outside speakers, faculty- and student-run discussions, and weekend field trips to zoos and other facilities.

139972 **Introduction to Animal Welfare Science**

Subject: Catalog Nbr:
APP 1008

2023 SPRG

Primary

Emily McCobb

emily.mccobb@tufts.edu

This course will explore a range of subjects related to animal welfare. The goal is for the student to understand various

Course Bulletin

perspectives and definitions of animal welfare, methods for scientific study and evaluation of animal welfare, the effect of policy and markets on shaping of practices, and current welfare issues in areas such as animal agriculture, sport, science, and education. The course will review the history of animal welfare and the evolution of legislation and policy in the US and elsewhere. To follow, we will consider various aspects of assessing welfare, including stress, physical health, mental states, and quality of life. Issues such as selective breeding, environmental conditions, transportation, humane killing, and animals as business opportunities will be discussed with a cross-species approach. Finally, the students will be introduced to methods of conducting welfare assessments. The format of the course will include a blend of readings, lectures, practical experience, discussion, and student projects. Students are encouraged to participate in the Animal Welfare Judging and Assessment Contest hosted by AVMA after completing this course (if possible with the student's schedule.)

140030	Global Information Systems-Independent Study
Subject: MCM	Catalog Nbr: 1004

140065	JAX Medical and Experimental Mammalian Genetics
Subject: BMS	Catalog Nbr: 1008

140096	Community Cat Clinics
Subject: APP	Catalog Nbr: 1005
Students may receive elective credit for participating in a variety of community-service oriented activities, including animal shelter visitation, community cat clinics, support for the Tufts at Tech Community Veterinary Clinic, Tufts Paws for People, and the Tufts Pet Loss Hotline. Academic exercises matched to the service activities help illuminate the policy and practice context of the students' work.	

140216	International Environmental Law
Subject: MCM	Catalog Nbr: 1005

Course Bulletin

This course addresses the nature, content, and structure of international environmental law. The course commences with an introduction to international environmental problems, together with basic principles of international law and environmental regulation. Specific topics include global warming, stratospheric ozone depletion, and exports of hazardous substances. Other topics may include marine pollution, transboundary pollution, trade and environment, and development and environment. The course evaluates the role of international and non-governmental organizations; the interrelationship between international legal process and domestic law; and the negotiation, conclusion, and implementation of international environmental agreements. Students take this course at The Fletcher School.

140250	Immunology Seminar	
	Subject:	Catalog Nbr:
	BMS	1009

140255	Infection and Immune Response	
	Subject:	Catalog Nbr:
	BMS	1010

140256	Advanced Molecular Biology Seminar	
	Subject:	Catalog Nbr:
	BMS	1011

140381	Graduate Biochemistry	
	Subject:	Catalog Nbr:
	BMS	1012
<p>This course provides a graduate-level discussion of the structure and function of biologically important molecules. Problems of protein and nucleic acid biochemistry are emphasized. This course is offered through Sackler School.</p>		

140382	Biostatistics II	
	Subject:	Catalog Nbr:
	BMS	1013
<p>This course surveys regression techniques for outcomes common in public health data, including continuous, binary, count and survival data. Emphasis is on developing a conceptual understanding of the application of these techniques to solving problems and to cogently summarize the results, rather than numerical details. This course offered through the Clinical</p>		

Course Bulletin

and Translational Science department at Sackler School.

140385	Membranes and Trafficking
Subject: BMS	Catalog Nbr: 1014
This course provides a thorough survey of major topics in cell biology, including membrane structure and function; transport systems, ion channels, and membrane excitability; protein trafficking, and organelle biogenesis. This course is offered through the Integrated Studies Program at Sackler School.	

140386	Pet Loss Hotline
Subject: APP	Catalog Nbr: 1009
Students may receive elective credit for participating in a variety of community-service oriented activities, including animal shelter visitation, community cat clinics, support for the Tufts at Tech Community Veterinary Clinic, Tufts Paws for People, and the Tufts Pet Loss Hotline. Academic exercises matched to the service activities help illuminate the policy and practice context of the students' work.	

140387	Pet Loss Hotline
Subject: APP	Catalog Nbr: 1009
2023 SPRG	Primary Emily McCobb emily.mccobb@tufts.edu
Students may receive elective credit for participating in a variety of community-service oriented activities, including animal shelter visitation, community cat clinics, support for the Tufts at Tech Community Veterinary Clinic, Tufts Paws for People, and the Tufts Pet Loss Hotline. Academic exercises matched to the service activities help illuminate the policy and practice context of the students' work.	

140445	Journal Club/Seminar
Subject: LAM	Catalog Nbr: 592
Students, along with faculty members, participate in a monthly journal club for discussion of current literature in the field. The emphasis is on critical analysis, identifying significance of the research, and understanding how the findings extend current knowledge.	

140474	Veterinary Outreach Clinic
Subject: APP	Catalog Nbr: 1010
This elective is for a student with a strong interest in Community Medicine. The interested student will develop an independent project in the area of providing medical care to underserved pet owners. The project may involve time in the clinic or could be independent study about the needs of underserved families,	

Course Bulletin

researching community demographics and helping to build community partnerships. Strong Spanish language skills are preferred.

140487	Generalized Linear Models
Subject: BMS	Catalog Nbr: 1015
This course is offered at UMass Medical School, Graduate School of Biomedical Sciences.	

140490	Exploring Human Dimensions of Animal Behavior
Subject: APP	Catalog Nbr: 1011
How do our attitudes and perceptions of animals and their behavior influence our beliefs about, interactions with, and management of animals? How do our beliefs, values, and behavior impact animals, their behavior, welfare, and long-term survival? This course explores the human dimensions of animal behavior, examining human attitudes and behavior and their effect on animals. Students will develop ethograms, write one paper, and conduct a small research study in a group as well as participate in class discussions.	

140529	MCM Independent Study
Subject: MCM	Catalog Nbr: 1006
MCM independent study – in this independent study students may work on a project that allows further in depth analysis of a topic of their choice or related to an ongoing course they are enrolled in. The study may be in the form of direct experience including, but not limited to observing group meetings or conferences with submission of a written analysis, or academic work including writing a research paper on a topic . The work may not substantially overlap with the student’s year-long case study project. Students are expected to prepare an outline of the proposed work and have it approved by the MCM program director and faculty before beginning the work. The work will be graded as outlined by the faculty mentor for the independent study.	

140571	Epidemiology of Zoonotic Infections
Subject: MCM	Catalog Nbr: 1007
This course seeks to provide health professionals with the basis for evaluating risks and formulating prevention and intervention strategies for outbreaks or endemic transmission of zoonotic infections. Each session is structured with a “vertical” component comprising general principles, and a “horizontal” component comprising a case study of a specific agent that illustrates the general principles. Course offered every other year and is cross listed with BMS 655.	

140827	Dimensions of Human and Animal Infectious Diseases I
---------------	---

Course Bulletin

Subject: Catalog Nbr:
IDGH 540

Infectious Diseases of Humans and Animals I covers important infectious disease in humans and animals. Part I includes five topically-related Units: 1) Introduction; 2) Respiratory Tract Unit; 3) Gastrointestinal Tract Unit; 4) Urogenital Tract Unit; and 5) Disease Ecology Unit. For each body systems-focused unit, normal anatomy and physiology are first reviewed. Additional lectures focus on cellular and molecular targets of infection, host immune and inflammatory responses, and disease-related lesions. The Disease Ecology Unit focuses on species and population interactions and environmental aspects that influence the patterns of disease. Reading from texts, published research papers, homework, student presentations and projects round out the material.

140829	Applied Immunology and Vaccinology		
Subject: IDGH	Catalog Nbr: 540		
2022 FALL	Primary	Abhineet Sheoran	abhineet.sheoran@tufts.edu
<p>This course will teach the principles of immunology and comparative immunology and then apply them to understand immune responses against intracellular and extracellular infectious agents, immunotherapies, immunodiagnostics, and immune reactions and disorders. In addition, the course will examine (a) how the immune system can be manipulated in order to benefit the animal, (b) how knowledge of the immune response against an infectious agent is applied to designing and developing effective vaccines, and (c) what are the challenges for developing and other aspects of vaccine development. Problem-based sessions are incorporated for discussing and understanding of basic and applied aspects of immunology, and enhancing group collaboration and communication.</p>			

140830	Research Training with Lab Rotation		
Subject: IDGH	Catalog Nbr: 542		
<p>Students will spend time in each laboratory in the DIDGH to have a deeper understanding of various infectious disease research projects and approaches used to answer research problems specific to each project. Interaction with faculty and scientist, and type of pathogen and problems studied and techniques used in each laboratory will help students identify a laboratory for their summer research work.</p>			

140831	Microbiology and Immunology Techniques		
Subject: IDGH	Catalog Nbr: 543		
<p>This course will provide students with a hands-on opportunity to learn both the theoretical basis and practical application of a variety of immunological and microbiological techniques commonly used in infectious disease research. Specifically, students will learn how to utilize antibodies to determine concentration of a target molecule in a biological sample, identify pathogens and their antigens, characterize lymphocyte subset responses, neutralize pathogens/toxins and purify pathogens and their virulence factors. Students will also learn to isolate, cultivate and identify bacteria, fungi, viruses and protozoa. In addition, students will learn sterile technique, including preparation of glassware and reagents, how to handle biomedical waste both</p>			

Course Bulletin

within the laboratory and under field conditions and how to address a biological spill.

140832	Fundamentals of Biostatistics		
Subject: IDGH	Catalog Nbr: 544	2022 FALL	Primary Adam South
Adam.South@tufts.edu			
<p>Introductory statistics will be learned using an active approach, emphasizing practical applications of statistical concepts. Students will gain experience in analyzing data sets and presenting data. In addition, students will become familiar with using Excel for basic statistical analyses and more specialized programs for more advanced statistics, such as SPSS. Laptop computers are required.</p>			

140833	Research Ethics		
Subject: IDGH	Catalog Nbr: 545		
<p>This course will introduce ethics, science and society and address key issues affecting the responsible conduct of scientific research, including (1) animal use (ethical treatment of laboratory animals, laboratory animal care training, and IACUC); (2) human subjects (informed consent, IRB, training requirements and resources, clinical research and trials, regulations governing clinical investigation, cultural issues, and research/trials in developing countries); (3) laboratory safety and compliance (basic safety, biohazards, recombinant DNA, hazardous chemicals, transfer of etiologic agents, radioactivity); (4) dealing with scientific misconduct (where to report, whom to turn to for support and advice); (5) scientific communication i.e. presentations and publications (seminars and publications, citing the work of others, plagiarism, authorship, order of authors); (6) results of research and note keeping (verification, repetition, data ownership and legal ramifications); (7) conflict of interest and conflict of commitment; intellectual property (protection and rights). This course will also utilize case studies and ethics training through various online web portals to enforce deeper understanding of ethical issues in scientific research.</p>			

140834	Journal Club		
Subject: IDGH	Catalog Nbr: 546		
<p>Students will present scientific papers relevant to infectious disease. All students will be required to thoroughly study the article before the Journal Club. Papers will cover diverse aspects of infectious diseases and be chosen via consultation with students' individual faculty mentors and the Course Director. The presentations will be powerpoint-based (40-50 min), which will be followed by extensive group discussion (20-30 min). The sessions will help students to enhance the skills of analytical reading and critique. The presentations will focus on critical analysis of the results/data, evaluation of the scientific merit of the paper, stimulating class-discussion of the paper and related literature, and developing presentation skills. Students will take Journal Club in both the Fall and Spring semesters. The journal club will be open to everyone and advertised campus-wide. Visiting and resident faculty will be strongly encouraged to attend as well as veterinary students, other graduate students and members of the Tufts community.</p>			

Course Bulletin

140835	Dimensions of Human and Animal Infectious Diseases II			
Subject: IDGH	Catalog Nbr: 547			
2023 SPRG	Primary	Giovanni Widmer	giovanni.widmer@tufts.edu	
<p>The course provides a system-based overview of infectious agents of the nervous system, skin, and blood (including the reticuloendothelial system). This course also provides basic understanding of biosafety, food safety and regulatory compliance. It is subdivided in 6 modules. Four modules are focused on pathogens and the various diseases they cause. Two additional modules focus on biosafety and food safety, respectively. The introductory lecture for each infectious disease module describes the anatomical and physiological features of relevant organs. Model bacterial, viral, fungal and parasitic pathogens that cause disease domestically and/or globally are covered in depth. The etiology, pathogenesis, immunology, epidemiology, diagnosis, prevention and control of selected pathogens are discussed. Reading of relevant scientific literature complements the lectures.</p> <p>The food safety module introduces students to local, state and federal regulatory agencies, regulations, and surveillance systems relevant to food safety. Transmission and risk assessment of foodborne pathogens are discussed. Students will also learn about new food safety challenges related to trade, climate change and antimicrobial resistance.</p> <p>The biosafety module provides basic understanding of biosafety and regulatory compliance. The course covers biosafety level 2 (BSL-2), BSL-3 and BSL-4 laboratory environments. Topics of interest include risk assessment and hazard identification of infectious agents through case studies, biosafety design criteria for facility design, regulations/guidelines, regulatory compliance and biosafety audits.</p>				

140836	Microbial Molecular Biology			
Subject: IDGH	Catalog Nbr: 548			
2023 SPRG	Primary	Akram Da'darah	Akram.Da_darah@tufts.edu	
<p>The first part of the course will cover basic topics of molecular biology relevant to the understanding of viral, bacterial and protozoal microorganisms. Following an overview of the structure and function of nucleic acids, prokaryotic and eukaryotic gene expression and regulation will be discussed. The second part of the course will be devoted to applied topics in molecular biology, including genetically modified organisms, genotyping methods, medical molecular biology, high-throughput sequencing and its application to genomics and the analysis of complex bacterial populations. An introduction into computational methods for analyzing complex sequence data and their application to studying host associated microbial populations and their impact on health and disease will complete the course.</p>				

140837	Animal Models of Infectious Diseases			
Subject: IDGH	Catalog Nbr: 549			
2023 SPRG	Primary	Abhineet Sheoran	abhineet.sheoran@tufts.edu	
Students will learn the rigors of animal model work in research, which requires taking care of animals on				

Course Bulletin

weekends and holidays. They will use mouse model to (a) study *Cryptosporidium parvum* infection in immunocompetent and immunodeficient hosts, and (b) investigate immunoprophylactic potential of Shiga toxin 2 (Stx2)-specific human monoclonal antibody (HuMAb) 5C12 against a challenge with Stx2. Students will learn to perform mouse handling, oral inoculations, intraperitoneal injections, sample collections (mostly blood and fecal collections), and humane euthanasia of mice and disposal of carcass. They will learn to work in Animal Biosafety Level 2 environment, monitor animals as per animal protocol approved by the IACUC (Institutional Animal Care and Use Committee) and observe and record clinical signs of the disease, analyze samples with immunological and molecular assays, interpret data/results, prepare graphs/tables and write a manuscript-style report. Students will also learn basics of good laboratory practice.

140839	Food Safety
Subject: IDGH	Catalog Nbr: 561
<p>Students will become familiar with the more common food-borne illnesses and the risks of transmission from meat, poultry, dairy, eggs, and other foods. They will learn the principles of the Hazard Analysis and Critical Control Points system (HACCP) and the common diagnostic techniques used to monitor food safety, including detecting microorganisms and chemicals. Students will also learn the use of antimicrobial in food producing animals and development of antibiotic resistance, and understand the roles of a variety of state, federal, and global regulatory agencies which recommend and implement food protection practices.</p>	

140840	Applications of Biotechnology
Subject: IDGH	Catalog Nbr: 562
<p>Biotechnology is “the application of biological organisms, systems, or processes by various industries to learning about the science of life and the improvement of the value of materials and organisms such as pharmaceuticals, crops, and livestock” (ACS). Classes will explore different biotechnology applications, particularly those technologies of relevance to infectious disease. Students will learn how the technologies were developed, how they are being applied to global health issues, and how they are likely to evolve in the future. As part of the course, students will be asked to select biotechnologies they feel will be important to their personal career objectives, investigate these in depth and present their findings and views to the class followed by general discussion.</p>	

140841	Molecular Biology Techniques
Subject: IDGH	Catalog Nbr: 563
2023 SPRG	Primary Akram Da'darah
<p>The goal of this course is to provide students with hands-on experience in molecular biology procedures. Having first established good laboratory technique (to encompass safety and regulatory issues), students will have the opportunity to learn a variety of molecular methods including DNA isolation, digestion and cloning, bacterial transformation, evaluation of recombinant clones and plasmid isolation. Students will engage in primer design, gel electrophoresis, PCR (including quantitative real time PCR), DNA barcoding and sequence annotation. Basic bioinformatic skills will be explored. Recombinant protein expression systems will be</p>	
Akram.Da_darah@tufts.edu	

Course Bulletin

compared (eukaryotic versus prokaryotic) and various recombinant protein expression and purification techniques (e.g. column chromatography and affinity methods) will be tested. Science writing skills that focus upon clarity, precision and comprehension of experimental results and conclusions will be emphasized. Students will gain a firm understanding of how the molecular biology techniques employed in this class are used to diagnose, identify and study infectious diseases.

140842	Ecology of Disease Transmission		
Subject: IDGH	Catalog Nbr: 564		
<p>This course will teach how host behavior, ecology and habitat patterns impact pathogen invasion dynamics or the spatio-temporal patterns of infectious diseases. Students will acquire a basic understanding of the principles of disease ecology and disease emergence including the major drivers of emergence, the relationships with biodiversity, and the effects of climate change. Key diseases of concern for conservation medicine and ecosystem health will be reviewed as examples. Emphasis will be placed on the integration of animal, human, and environmental health, and the environmental, economic, and anthropogenic factors promoting the emergence or persistence of infectious diseases and other major health threats.</p>			

140843	Global Health and Threat of Emerging Pandemics		
Subject: IDGH	Catalog Nbr: 565		
2023 SPRG	Primary	Janetrix Amuguni	Janetrix.Amuguni@tufts.edu
<p>This course will focus on infectious diseases that threaten global health and insecurity, their relation to poverty and development and how economic level, inequity, and policies of nations determines the health of its citizens. Using the lens of infectious diseases covered in previous courses, we will underscore the historical milestones, actors, assumptions, context and theories driving selected infectious diseases and their global health priorities in policy, programs and research. A recurring theme throughout the course is that there are common global drivers of infectious disease emergence and re-emergence influencing the health of populations in high, middle and low-income countries, that cross-cutting issues of inequality and systems transcend settings. The course will also examine the outcomes resulting from the ways in which new global health policies change patterns of health practice and Infectious disease intervention globally. That students will come out with an understanding of major challenges and solutions to infectious diseases of global health significance, programs and policies and be able address global health issues from an inter-disciplinary perspective, examine strategies and solutions for combating emergence and re-emergence of pandemics and promoting Global Health threats. This course is a reminder that no one person, agency or organization holds absolute knowledge on how best to address Infectious disease and Global Health challenges and that it has to be a multidisciplinary effort.</p>			

140846	Principles of Laboratory Management and Biosafety		
Subject: IDGH	Catalog Nbr: 568		
<p>The course will provide in-depth understanding of biosafety and regulatory compliance, and laboratory management. The course will cover biosafety considerations of the BSL-2 and BSL-3 laboratories, risk</p>			

Course Bulletin

assessment and hazard identification of infectious agents, biosafety design criteria for facility design, regulations/guidelines and regulatory compliance with federal/state and local laws, biosafety audit of work practices and procedures, management principles and managing a laboratory, and many other aspects of biosafety and laboratory management.

140847	Research Assignment		
	Subject: IDGH	Catalog Nbr: 569	
<p>Students will develop and write research proposals, with a focus on addressing specific, human and/or animal, local or global, serious infectious diseases, including emerging infections. Each student will investigate and understand in depth a particular research problem. The proposal will include long and short term goals, hypothesis, specific aims, comprehensive literature survey on the subject, approach to solutions, methodology, biostatistics, expected outcome. Students will get opportunity to work and think independently, read scientific literature, develop oral/written communication, identify techniques to answer a research problem, and appreciate research process. The project will be presented orally to the class and written up and submitted as a significant part of the final course evaluation. Mentors will be assigned to each student to provide guidance as needed.</p>			

140848	Introduction to Human-Animal Interactions		
	Subject: APP	Catalog Nbr: 531	
<p>This interdisciplinary course explores human-animal relationships as a context for promoting health and well-being for humans, animals, and communities. The course focuses on integrative research and application in human-animal interaction, and will cover a range of topics such as the role of animals in promoting positive human development, animal-assisted therapy, animals in the family setting, and animals in educational and programmatic contexts. Additional context is provided in the form of class sessions on humane education and the role of animals in literature and art.</p>			

140849	Research Methods I		
	Subject: APP	Catalog Nbr: 518	
<p>This discussion course will focus on critical reading of the quantitative and qualitative research literature on human-animal relationships. Students will read and present assigned papers, lead and participate in discussions, conduct literature searches, prepare a literature review, and write a research proposal in an area of interest.</p>			

140850	Statistics I		
	Subject: APP	Catalog Nbr: 516	
	2022 FALL	Primary	Adam South
			Adam.South@tufts.edu

Course Bulletin

This course introduces students to the basics of statistical methods and research design. Students learn to state hypotheses, evaluate sampling procedures, create and manage data sets, and carry out basic statistical testing. Examples are drawn from research in veterinary medicine, animal science, human-animal relationships, and animal ecology.

140851	Communicating Policy Positions				
	Subject:	Catalog Nbr:			
	APP	524			
	2023 SPRG	Primary	Allen Rutberg		allen.rutberg@tufts.edu
<p>The course requires students to draft and revise documents targeted at diverse audiences, including letters to the editor, blogs, op-eds, fact sheets, legislative testimony, and formal comments on draft regulations and other proposals for government actions, and to develop skills in making presentations to the public, legislators, legislative hearings, and other forums.</p>					

140852	Research Methods II				
	Subject:	Catalog Nbr:			
	APP	519			
	2023 SPRG	Primary	Seana Dowling-Guyer		Seana.Dowling_guyer@tufts.edu
<p>This course provides more in-depth exploration of survey design, content analysis, and qualitative techniques such as interviews, ethnography, and focus groups. All students will produce a research proposal, which for research track students will lead directly to their capstone research project.</p>					

140853	Mentored Externship				
	Subject:	Catalog Nbr:			
	APP	532			
<p>Students in the applied track complete their program by working at a government agency, legislative office, non-profit organization, or other entity that influences, makes, or implements animal policy or advances human-animal relationships. The students will analyze and synthesize their experiences in a substantial research paper and an oral report to classmates and Center faculty.</p>					

140854	Independent Research I				
	Subject:	Catalog Nbr:			
	APP	526			
<p>For their capstone activity, students in the research track work independently with individual mentors to complete their research projects, with the expected outcome being an article that is potentially publishable in a peer-reviewed journal, or other scholarly product the dissemination of which will advance and inform animal policy or practice.</p>					

140855	Independent Research II				
---------------	--------------------------------	--	--	--	--

Course Bulletin

Subject: Catalog Nbr:
APP 527

For their capstone activity, students in the research track work independently with individual mentors to complete their research projects, with the expected outcome being an article that is potentially publishable in a peer-reviewed journal, or other scholarly product the dissemination of which will advance and inform animal policy or practice.

140856 **Statistics II: Intermediate**

Subject: Catalog Nbr:
APP 517

2023 SPRG Primary Adam South Adam.South@tufts.edu

Intended for advanced research track students and tailored to their interests, this course will focus on experimental design and analysis of survey data, exploring the use of analysis of variance (ANOVA) and regression models, factor analysis, and other advanced techniques using SPSS or an equivalent statistical package.

140912 **Introduction to Policy**

Subject: Catalog Nbr:
APP 1012

This lecture-discussion class is a quick introduction to the mechanisms of government with an emphasis on animal and environmental policy. Also examined are how history, culture, ethics, and the media influence the making and implementation of animal and environmental policy.

140997 **Participatory&Community Approaches Epi Rsch, Disease Surveillance and Hlth Service**

Subject: Catalog Nbr:
MCM 1008

This course is designed to be a practical introduction to epidemiological and service delivery methodologies that stress participation and community ownership. The course will combine a minimal amount of introductory lecture with in-class participatory learning exercises and discussion. The course will first look at the underlying concepts of participation and community-based development. Thereafter, the sessions will focus on specific methods and students will be asked to complete a group project using these skills. The group projects will consist of participatory assessments conducted within the University community on a health related theme. The course will close with sessions on community-based health care and the policy and institutional frameworks required for sustainable community-based programs. At the end of the course, students should be adequately prepared to conduct a mentored summer research project in participatory epidemiology.

141109 **GIS for Conservation Medicine**

Subject: Catalog Nbr:

Course Bulletin

MCM 1009

This course will introduce students to the fundamental concepts of the Geographic Information Systems (GIS) as it relates to the one health paradigm and veterinary health. This course is designed for novice GIS students with specific focus on mapping and spatial analysis for human, animal, and environmental health applications. Tutorials include vulnerability analyses of animal habitats, monitoring disease outbreaks for public health, calculating deforestation and land cover change, suitability analysis for Ebola treatment centers in Liberia, site analysis for alternative energy sources, and many more. Technical topics to be covered include GIS data discovery; GPS field data collection; data structure and management; principles of cartographic visualization and design; and basic spatial tools, analysis and modeling. Classes will consist of both a lecture segment and an in-class activity/demonstration. Students will complete weekly tutorials or project assignments and conclude the semester with a final mapping/analysis project of their choosing. This course is open to all students and faculty from the Veterinary School.

141125	Immunohistochemistry & Microscopy
Subject: BMS	Catalog Nbr: 1016
Course taken at Woods Hole Institute.	

141126	Introduction to Neuroscience
Subject: BMS	Catalog Nbr: 1017
Course offered through UMass Medical School.	

141127	Bases of Brain Disease
Subject: BMS	Catalog Nbr: 1018
Course offered through UMass Medical School.	

141128	Genetic Basis of Behavior
Subject: BMS	Catalog Nbr: 1019
Course offered through UMass Medical School.	

141129	Current Topics in Aging
Subject: BMS	Catalog Nbr: 1020
Course offered through UMass Medical School	

Course Bulletin

141198	Principles of Biostatistics			
Subject: BMS	Catalog Nbr: 1021			
<p>This course is offered through PHPD at Tufts Medical School, and provides an introduction to the basic principles and applications of statistics as they are applied to problems in clinical and public health settings. Topics include the description and presentation of data, random variables and distributions, descriptive statistics, introduction to probability, estimation, elements of hypothesis testing, and one- and two-sample tests, ANOVA (including repeated-measures), non-parametric tests, and an introduction to linear and logistic regression. Lectures, problem sets, and computer output are used to develop these and additional concepts. Graduate standing.</p>				

141533	Paws for People			
Subject: APP	Catalog Nbr: 1013			
2022 FALL	Primary	Megan Mueller		Megan.Mueller@tufts.edu
<p>Due to COVID-19 restrictions on in person therapy animal visitation, the Paws for People elective will take place remotely until further notice. In person events may resume at some point during the 2021-2022 year. There is a 1.0 and 2.0 credit option.</p> <p>1) Pet Partners Training Class taught by Pet Partners instructors on becoming a registered visitor; what the animal handler needs to know, following this class students will be eligible to apply to Pet Partners for registration as a trained visitor. There is no fee for students to take this Pet Partners Course. This includes a student manual and all associated materials. Due to COVID restrictions, this course must be taken as an on-line option through Pet Partners (petpartners.org) until the in-person training resumes.</p> <p>2) Evaluations and Visitations (For 2.0 credit option only)</p> <p>A) Students will view a webinar conducted by Deb Gibbs, Paws for People program evaluator, on how to prepare for an evaluation</p> <p>B) Students will view videos of Pet Partners evaluations and complete a reflection assignment.</p> <p>C) Students will view videos of various types of animal-assisted interventions and complete a reflection assignment.</p> <p>3) Assignment The student will be required to complete an assignment related to animal assisted interventions. A number of projects are available as options (eg, grant proposal, research projects, etc). These must be discussed with and pre-approved by the faculty advisor to determine which the best fit is for the individual student.</p>				

141551	Applied Animal Behavior			
Subject: APP	Catalog Nbr: 1014			
2023 SPRG	Primary	Seana Dowling-Guyer		Seana.Dowling_guyer@tufts.edu
<p>This course will focus on applied behavior topics of common companion, farm, and zoo animals. We will discuss animal body language and typical behavior and compare that to people's perceptions of that behavior. Assessment of behavior and common problem behaviors will be reviewed along with effective management</p>				

Course Bulletin

and modification techniques of those problems. Force-free handling and positive reinforcement training will be emphasized. We will examine abnormal behavior particularly as it relates to stress and poor welfare and design remediation, management, and modification programs to mitigate that behavior, with the goal of improving welfare. This course builds on topics covered in APP 1011 Principles of Animal Behavior and APP 1007 Wildlife in Captivity, and relates to APP 1008 Introduction to Animal Welfare but it is not necessary to have taken any of those courses nor is this a repeat of those courses. This course will be a mix of lecture, discussion, and hands-on work with animals. Students will design their own assessment and training programs, implement them, and record their progress and outcome. There will be several smaller research and writing assignments as well. Students will gain an understanding of the typical behavior of select animals, assessment techniques and indicators of poor welfare, and effective strategies for working with those animals in a variety of settings as well as appreciate the role of human companions and caretakers in the expression and perception of animal behavior.

141632	GIS for Conservation Medicine			
Subject:	Catalog Nbr:			
MCM	591			
2022 FALL	Primary	Carolyn Talmadge	Carolyn.Talmadge@tufts.edu	
<p>This course will introduce students to the fundamental concepts of the Geographic Information Systems (GIS) as it relates to the one health paradigm and veterinary health. This course is designed for novice GIS students with specific focus on mapping and spatial analysis for human, animal, and environmental health applications. Examples include vulnerability analyses of animal habitats, monitoring disease outbreaks for public health, calculating deforestation and land cover change, site analysis for alternative energy sources, and many more. Technical topics to be covered include GIS data discovery; GPS field data collection; data structure and management; principles of cartographic visualization and design; and basic overlay tools, analysis and modeling. Classes will consist of both a lecture segment and an in-class activity/demonstration. Students will complete weekly tutorials or project assignments and conclude the semester with a final mapping/analysis project of their choosing.</p>				

141824	Principles of Epidemiology			
Subject:	Catalog Nbr:			
IDGH	570			
2023 SUMR	Primary	Adam South	Adam.South@tufts.edu	
<p>Epidemiology is the lynchpin science of public health. In combination with biostatistics, it is used to examine disease patterns and infer causes of diseases at population level, and many other types of issues such as whether a new drug is more effective than an old one, what the risk factors are for a given outcome, whether a new screening test is likely to be useful and, if so, in which population, what levels and types of air and water pollution should be of most concern, etc. To accomplish its varied objectives, epidemiology uses many different kinds of measures, study designs, and data analytic techniques. We will examine many of these in this course including: (1) Understand the basic structure of public health, its goals, and where epidemiology fits into the structure; (2) Know how to calculate and interpret important rates and measures used in epidemiology and public health and how to interpret confidence intervals around certain of these rates and measures; (3) Interpret basic epidemic curves; (4) Understand in general the design, strengths, weaknesses and ethical issues of the major types of epidemiologic studies; (5) Identify the three major causes of</p>				

Course Bulletin

erroneous conclusions in epidemiologic research and how each one can be adjusted for or avoided; (6) Recognize effect modification (also called interaction) in data; (7) Learn how screening is employed in public health, including the basic measurements used to evaluate screening tests and the biases that can affect the accuracy of reported screening efficacy.

141825	Bioterrorism: Risks and Defense Strategies			
Subject:	Catalog Nbr:			
IDGH	571			
2023 SPRG	Primary	Sam Telford III		Sam.Telford@tufts.edu
<p>Terrorist attacks in many parts of the world has focused attention on the possibility that pathogens and toxins may be used as weapons targeting humans or economically important animals and plants. The issues surrounding bioterrorism and its critical complement, biodefense, are complex and require an understanding of sociopolitical factors as well as those of biology. This course seeks to provide the basis for (1) critically evaluating the risks associated with bioterrorism and (2) developing strategies for defending against as well as responding to the illegitimate use of biological agents. Each of the sessions will be structured around a key reading or two designed to illustrate general concepts. Original, peer reviewed publications or policy papers will mainly serve as key readings.</p>				

141841	Topics in Animal Ethics			
Subject:	Catalog Nbr:			
APP	1015			
<p>This course will use a series of student exercises, presentations, and discussions to explore the application of theories of ethics and cultural construction to issues surrounding human treatment of animals. Topics will include current theories of animal ethics, cross-cultural construction and categorization of animals, the ethics of pet-keeping, the relationship of animal mind to ethical standing, breeding and genetic manipulation of domestic animals, ethical paths toward humane treatment of wildlife, and others. Assignments will include essays, visual analyses, and student presentations.</p>				

141842	Wildlife Module from Animals in Society II Course			
Subject:	Catalog Nbr:			
APP	1016			
<p>This module of Animals & Society II focuses on wildlife and wildlife policy. Evaluation is based on a series of written exercises, oral presentations, and class participation. The module meets for eleven 2-hour sessions (22 contact hours, and thus only 1.5 credits for the MCM program students). Students must get approval from Dr. Rutberg to take the module; familiarity with the basic structures of American government is strongly desired.</p>				

142492	Research Methods			
Subject:	Catalog Nbr:			
APP	1018			

Course Bulletin

This course provides an exploration of survey design, content analysis, and qualitative techniques such as interviews, ethnography, and focus groups. Students in this elective course will complete design and preparation assignments and produce modified versions of the literature review and proposal.

143489	Human-Animal Interactions			
Subject: APP	Catalog Nbr: 1019			
<p>This interdisciplinary course explores human-animal relationships as a context for promoting health and well-being for humans, animals, and communities. The course focuses on integrative research and application in human-animal interaction, and will cover a range of topics such as the role of animals in promoting positive human development, animal-assisted therapy, animals in the family setting, and animals in educational and programmatic contexts. Additional context is provided in the form of class sessions on humane education and the role of animals in literature and art.</p>				

143490	Introduction to Global Health			
Subject: IDGH	Catalog Nbr: 572			
2022 FALL	Primary	Diafuka Saila-Ngita	Diafuka.Saila_Ngita@tufts.edu	
<p>While debates abound on the definition – and utility – of this rapidly emerging field, it is fundamentally a multidisciplinary approach to understanding health and disease in populations, drawing on epidemiology, sociology, anthropology, political science, social sciences, clinical medicine, history, the list goes on.</p> <p>Global health as a field reflects the need for increasingly complex and multidisciplinary approaches to understanding health and disease in populations, brought on by an increasingly interconnected and changing world. Global health not only considers the epidemiological and transmission dynamics of disease, but the social and political dynamics as well.</p> <p>Course Goal This course is designed to provide students with an overview of global health and equip students with the proper framework, context, and terminology to understand the social, political, and economic aspects of health and disease on a global scale.</p>				

143491	Case Studies in Global Health			
Subject: IDGH	Catalog Nbr: 573			
2023 SUMR	Primary	Nicola Bulled	Nicola.Bulled@tufts.edu	
<p>This course will illuminate the complexity and multi-dimensionality of the evolving infectious disease pandemics, as illustration of the relationships between disease biology, society, and public policy. We will explore the history, changing trends, recent advances, and multidisciplinary strategies for addressing three independent and interacting infectious diseases: HIV, Ebola, and Tuberculosis. We will examine gender relations; poverty; stigma and discrimination; vulnerable populations; as well as global responses, from patient activism to 'global health' interventions. This course will build upon the introductory course in Global</p>				

Course Bulletin

Health and course on Infectious Diseases in Global Health, but with a greater focus on social issues surrounding the pandemics, lived experiences of disease, the interactions between biology and social factors, and the political architectures of responses. The course will include lectures and documentaries, interactive classroom activities and discussions, and group projects and presentations.

143495	Intermediate Statistics	
Subject:	Catalog Nbr:	
APP	1021	

143531	MAPP Independent Study	
Subject:	Catalog Nbr:	
APP	1022	

143799	Fundamentals of Biostatistics			
Subject:	Catalog Nbr:			
MCM	592			
2022 FALL	Primary	Adam South		Adam.South@tufts.edu
<p>Introductory statistics will be learned using an active approach, emphasizing practical applications of statistical concepts. Students will gain experience in analyzing data sets and presenting data. In addition, students will become familiar with using Excel for basic statistical analyses and more specialized programs for more advanced statistics, such as SPSS. Laptop computers are required.</p>				

143807	Case Study			
Subject:	Catalog Nbr:			
MCM	585			
<p>The case study will provide a capstone exercise that builds on a student's knowledge and skills to produce a comprehensive conservation medicine analysis of a current health problem and recommend strategies to address identified challenges. Each student will identify an issue and will be charged with leading a collaborative team involving other students and appropriate faculty. Cases will undergo a peer-review evaluation through our network of conservation medicine partners. At the end of the year, case studies will be compiled and submitted for publication. Students register for the Case Study during the fall and spring semesters, and are expected to complete their Case Study during the summer</p>				

143882	Special Events			
Subject:	Catalog Nbr:			
APP	9000			
<p>This is not a course, but a number assigned to special events that are not credit bearing. This is to enable</p>				

Course Bulletin

information to go on TUSK for calendar purposes.

143883	Special Events
Subject: MCM	Catalog Nbr: 9000
This is not a course, but a number assigned to special events that are not credit bearing. This is to enable information to go on TUSK for calendar purposes.	

143884	Special Events
Subject: IDGH	Catalog Nbr: 9000
This is not a course, but a number assigned to special events that are not credit bearing. This is to enable information to go on TUSK for calendar purposes.	

144368	Bioinformatics
Subject: IDGH	Catalog Nbr: 1001
2023 SPRG	Primary
Giovanni Widmer	giovanni.widmer@tufts.edu
<p>The course focuses on computational methods to analyze DNA and amino acid sequences. Four hours will be devoted to lectures. Each lecture will introduce a topic. Following each lecture, students will be guided through a computational analysis which students will run on their laptop. Students will learn to recognize different file formats, query and compare sequences and apply programs to extract biological information from complex sequence data. The exercises will emphasize the analysis of pathogenic microorganisms and their interaction with the host. Assessment will be based on three take-home exercises and a final 1 h in-class problem solving session.</p> <p>Goal</p> <p>Whether studying complex microbial populations or sequencing a plasmids, DNA and protein sequences are ubiquitous in biomedical research. The goal of the course is to demystify the analysis of sequence data and to provide basic familiarity with a few bioinformatics tools commonly used in this field.</p>	

144369	Applications of Biotechnology
Subject: IDGH	Catalog Nbr: 1002
2023 SPRG	Primary
Charles Shoemaker	Charles.Shoemaker@tufts.edu
<p>Biotechnology is “the application of biological organisms, systems, or processes by various industries to learning about the science of life and the improvement of the value of materials and organisms such as pharmaceuticals, crops, and livestock” (ACS). Classes will explore different biotechnology applications, particularly those technologies of relevance to infectious disease. Students will learn how the technologies were developed, how they are being applied to global health issues, and how they are likely to evolve in the future. As part of the course, students will be asked to select biotechnologies they feel will be important to</p>	

Course Bulletin

their personal career objectives, investigate these in depth and present their findings and views to the class followed by general discussion.

144992	Research Methods
Subject: APP	Catalog Nbr: 504

144993	Quantitative Methods
Subject: APP	Catalog Nbr: 506
Quantitative Methods	

144994	Tutorial I
Subject: APP	Catalog Nbr: 508

144996	Legislative Case Study
Subject: APP	Catalog Nbr: 505

144997	Tutorial II
Subject: APP	Catalog Nbr: 511

144998	Seminar Series I
Subject: APP	Catalog Nbr: 510

144999	Final Project
Subject: APP	Catalog Nbr: 515

Course Bulletin

--

145242	Chiropteran Health
Subject: MCM 2023 SPRG	Catalog Nbr: 1010 Primary Alison Robbins alison.robbins@tufts.edu
<p>One Health is an approach that recognizes that the health of people is closely connected to the health of animals and our shared environment (definition by the CDC). Under the One Health working and teaching frame, this selective will explore the interrelationships between bat health, human health, and ecosystem health. The student will learn about the taxonomy, anatomy, physiology of bats, population monitoring approaches and technologies, threats to bat populations and human/bat conflict mitigation. Numerous guest lecturers, consisting of conservationists, rehabilitators and wildlife scientists, will share their expert knowledge and give the student insight on real-life bat work. If allowed, field trips to zoological institutions housing chiropterans will be organized. The students will be exposed to on-campus population monitoring efforts and species identification.</p>	

145243	Drones: Unmanned Aircraft Systems (UAS) for Field Data Collection, Mapping & Analysis
Subject: MCM 2023 SPRG	Catalog Nbr: 1011 Primary Jon Caris jcaris@smith.edu
<p>This course covers the foundations of Unmanned Aircraft Systems (UAS) and provides students with the foundational skills to manage, plan and execute remote flight operations. Students will learn about the legal aspects of flying UAS and FAA requirements. Students will demonstrate the ability to collect and process imagery data for use in Geographic Information Systems (GIS) and for analysis. Students also develop skills that they can apply in multiple applications including conservation medicine, agriculture, natural and cultural resources management, emergency response, etc.</p>	

145245	Storytelling for Conservation
Subject: MCM 2023 SPRG	Catalog Nbr: 1012 Primary Katie Dolan katie.dolan2@tufts.edu
<p>What makes a compelling conservation story? How does a story take seed and spread? This course will explore the ways in which storytelling tools can help wildlife conservationists and animal advocates in their efforts to educate, persuade others, and create lasting results. We'll look at examples of great storytelling (in literature, film, social media, art, and photography) that has changed minds and influenced conservation and animal policies. We'll examine the role of storytelling in other cultures and as a way to bridge differences between social groups. We will explore new graphics and digital tools for communicating conservation messages. Over the semester, we'll discuss books, study visual arts, explore social media, and watch films, looking at a wide array of conservation issues, tools, and messages. Several expert storytellers will join us as guest speakers. A final storytelling project, using the tools we have examined, will be developed and presented by</p>	

Course Bulletin

student teams.

145806	AVMA: Animal Welfare Assessment Contest		
Subject:	Catalog Nbr:		
APP	1023		
2021 FALL	Primary	Emily McCobb	emily.mccobb@tufts.edu
<p>The Animal Welfare Assessment Contest (AWJAC) aims to provide a unique educational experience while strengthening student vocabulary and reasoning skills. The competition teaches students to assess the welfare of animals in a variety of settings using science-based methods and reasoning. Students are given the opportunity to weigh evidence and present sound evaluations. This contest ensures that tomorrow's leaders in the animal industries develop strong communication skills and acquire enhanced knowledge of animal welfare.</p>			

146017	Molecular and Cellular Immunology-UMass (BBS821)		
Subject:	Catalog Nbr:		
BMS	1022		

146174	Infection & Immune Response-UMassMed (BBS 775)		
Subject:	Catalog Nbr:		
BMS	1023		