INTRODUCTION

This Undergraduate Handbook has been prepared to introduce prospective students to the majors in the Department of Veterinary and Animal Sciences at the University of Massachusetts Amherst and to inform incoming and current students of the curriculum and requirements of our program. Our program includes a combination of courses that meet general education, writing, basic physical and biological sciences major requirements. The curriculum in the Pre-Veterinary major meets the requirements of Veterinary Colleges, Medical Colleges and Graduate Schools (for Masters and Ph.D. programs). The curriculum in the Animal Science major offers a variety of specialized courses that prepare students for careers in the Biotechnology, Health Sciences, and Livestock Industries and broadens the educational experience of students.

Because individuals have special interests, the departmental faculty encourages students to interact with the faculty to develop a program of study that meets their career objectives. This interaction is an on-going process in addition to the formal meetings between faculty members and advisees that are required in both the Fall and Spring semesters for registration of courses for the next semester. We offer a curriculum that combines basic science and experience in handling multiple animal species, ranging from small animals to large domesticated livestock, beginning from the student's first day on campus. The curriculum is designed to prepare our students for success in careers in healthcare, biotechnology, agriculture and other animal-related businesses and to give them a firm grounding on the critical thinking and deductive reasoning skills needed to adapt to change in the workplace.

STUDENT LEARNING OBJECTIVES

Animal Science Major and Pre-Veterinary Science Major

Learning Objective 1: Cellular and Animal Biology: Students will identify and define the role of the molecules that build cells, the foundations of cellular organization and communication, and the cellular assemblies that create the organs adapted to perform highly defined and required functions.

Learning Objective 2: Cellular and Animal Anatomy and Physiology: Students will recognize the anatomy of a variety of species including limbs and organs and the function of these organs that is required to establish and maintain homeostasis of living animals. Students will learn and perform basic reactions catalyzed by enzymes that make possible cellular function and homeostasis.

Learning Objective 3: Animal Husbandry: Students will identify different animals species, strains and breeds, the physiological and behavioral requirements for these species to thrive as well as how to the feed them including formulation of rations, how to breed and manage them to assure their well-being and productivity. Students will gain knowledge on the principles of immunization and will practice immunization along with other routine mgmt. procedures. Students will perform physical exams of a variety of species.

Learning Objective 4: Laboratory techniques and biotechnology: Besides learning the basis of laboratories techniques used in clinics and common microbiological and biotechnology procedures, students will run these procedures and clinical tests.

Learning Objective 5: Scientific awareness: Students will receive broad training in basic biological and physical sciences including upper-level coursework in genetics, immunology, reproduction and nutrition providing an emphasis on health-related technologies.

Learning Objective 6: Analytical skills: Students will acquire basic knowledge in mathematics and statistics. Students will design trials to demonstrate advantages and disadvantages of treatment and procedures. Students will catalog and analyze information.

Learning Objective 7: Critical and ethical thinking/problem solving: In addition to standard knowledge (fact-based), students are expected to develop abilities to gather information needed to address broad questions. Students will learn ethical use of animals for research and production.

Learning Objective 8: Communication: Students will write a cover letter such as those required for a job application or for applying to professional schools, will prepare a professional CV, write a lab report; summarize the main points of a manuscript and prepare a professional presentation either from data in the literature or from their own collected information.

DEPARTMENTAL MAJOR DESCRIPTIONS

The undergraduate program leads to a Bachelor of Science (BS) degree in Animal Science or Pre-Veterinary Science or Veterinary Technology. Incoming freshmen students must choose the Veterinary Technology major or the Animal Science major. Animal Science Majors must choose the Animal Biotechnology and Research concentration, or the Animal Management concentration, or the Equine Science concentration. Students can choose to change their concentration later if they find their interests are better suited to another concentration. Students must meet specific criteria (noted below) and complete an application to enter the Pre-Veterinary Science Major.

Veterinary Technology Major – This major provides students with the opportunity to spend two years at the University of Massachusetts Amherst campus learning in state-of-the-art classrooms, laboratories, and farms, followed by two years near Boston in the dedicated Veterinary Technology facility at the UMass Amherst-Mt. Ida campus in Newton, Massachusetts. Students graduating from UMass Amherst's BS-Vet Tech program will be prepared for a career as a veterinary technologist in veterinary medicine or biomedical research. Please note: **There is Veterinary Technology Major Handbook that outlines all the veterinary technology courses and requirements.**

Pre-Veterinary Science Major - This major provides pre-professional training to students planning to continue their education in Veterinary, Graduate or Medical school. To be eligible to enter the Pre-Veterinary major, students must achieve a weighted GPA of B- (2.700) or better in the following required courses:

ANIMLSCI 103 - Intro to Animal Management
ANIMLSCI 220 - Anatomy & Physiology of Domestic Animals
ANIMLSCI 285 or BIOLOGY 285 or BIOCHEM 285
– Cellular and Molecular Biology
BIOLOGY 151, 152, 153 - Introduction to Biology and lab
CHEM 111 & 112 - Inorganic Chemistry
CHEM 261 - Organic Chemistry
MATH 127 or MATH 131 – Calculus

Students may apply to change to the Pre-Veterinary Science major at any time after the above requirements are met. See pages 18 & 19 for suggested sequence of courses. Students who are unable to maintain an average grade of B- or better in those courses will have ample time to tailor their class choices to suit their area of interest and future career goals.

Animal Science Major - This major provides a sound background in the basic sciences to prepare students for a broad range of jobs in agriculture and related biomedical fields. Incoming freshmen students enter our program as Animal Science Majors and must choose Animal Biotechnology, Animal Management, or Equine Science concentration. Students can choose to change their concentration if they find their interests are better suited to another concentration.

Animal Biotechnology & Research Concentration

The Biotechnology & Research concentration is for those students interested in laboratory or research careers in the fields of veterinary and human health or biotechnology. Biotechnologists explore and develop new technologies in molecular biology, molecular genetics, embryo manipulation and cell and tissue culture. We encourage students to develop and pursue their research interests in the field, in the University's laboratories and off-campus. The Massachusetts Life Sciences Center Internship Challenge offers paid internships that have allowed our students to gain invaluable experience in biotechnology companies. (http://www.masslifesciences.com/programs/internship/) Animals contribute to human health through companionship, their role as models for diseases, as well as a source of food and fiber. There is a need for graduates who are familiar with animals to serve as lab technicians in the laboratories of both public and private research institutions. We encourage all students, regardless of their professional goals to participate in as many of these offerings as possible. See page 13 for the suggested sequence of courses.

Animal Management Concentration

Students who choose to follow a career in Management will have a well-structured and strong curriculum that can make them highly competitive in the market place, preparing them for both large-scale and small-scale farming of domestic animals, that is, "backyard to industrial". The 'buy local' movement is expected to increase available jobs in New England for those schooled in this field. The Department of Veterinary and Animal Sciences offers a series of courses that formalize the curriculum and accessory courses are taken in ancillary departments to provide expertise in non-domesticated animal management (wildlife, zoo, exotics) or for a career in teaching agriculture. Students have access to a number of animal species at our associated farms on which to learn management skills, including: Belted Galloway cattle, Boer meat goats, Dorset sheep, poultry and horses. We also partner with a local dairy farm where students care for the dairy calves and learn management skills. The Department of Veterinary and Animal Sciences emphasizes animal ethics of food animal production as well as the impact of farming techniques on the environment. In addition to our curricular offerings of reproduction, nutrition, diseases, and management, we offer numerous extracurricular activities to all interested students. These include: our Winter Traveling Dairy Tour class, our Artificial Insemination Certification class, participation in Regional and National Dairy Challenges, the Genex Open House and tour of Cornell Veterinary School, NESA (the Northeast Student Affiliate undergraduate regional division of the American Dairy Science Association) Intercollegiate Animal Science Competition, the Tufts annual WAZE Symposium, participation in livestock showing and judging at local fairs and the Boer Bash. Students also have the opportunity to participate in The Annual Baystate Livestock Classic; this show is open to the public and is held at the Hadley Farm. Students organize this event and learn the grooming and showing of cattle, swine, sheep, goats and horses. These events all promote positive student to student, student to faculty, and student to industry representative interaction, which can lead to post-baccalaureate internship employment, and graduate school opportunities. See page 14 for the suggested sequence of courses.

Equine Science Concentration

The Equine Science concentration in the Veterinary and Animal Sciences Department is based on knowledge of basic scientific concepts applied to the equine species and combined with hands-on stable management experience. Students learn the scientific concepts and practical application of the management, nutrition, veterinary care, breeding, and handling of horses through comprehensive coursework and technical training at the UMass Hadley Farm Equine Center. Students in the Equine Science concentration will work alongside equine health and reproductive specialists to learn herd and health management and the breeding industry including stallion collection, artificial insemination, pregnancy, and foaling. Students also have the opportunity to gain clinical experience working with our certified faculty in the new Equine Rehabilitation program. Other courses in this concentration include equine nutrition, equine behavior and learning theory, equine sports medicine, and development of young horses. Students will acquire basic scientific knowledge by taking courses in biology, chemistry, biochemistry, microbiology, and general animal science to broaden their knowledge and skills, preparing them for an array of careers, veterinary school, or graduate studies. The graduates of the Equine Science concentration will have many career opportunities. Career options include: veterinarian, nutritionist, equine rehabilitation practitioner, chiropractor, equine marketing specialist, breed association professional, equine science teacher, equine-assisted therapy director, and pharmaceutical research/sales. Students of the Equine Science concentration will gain real-world experience and build professional contacts through our internship program, career seminars, and industry association events. Students are encouraged to be involved in clinics and shows that are routinely held at the Hadley Farm, including multiple collegiate and USEF/USDF breed shows, along with the American Hanoverian Society Inspection. See page 16 for the suggested sequence of courses.

MINOR

The Department of Veterinary and Animal Sciences does not currently offer a minor. Animal Science students can choose to minor in other disciplines.

DUAL MAJOR/ DUAL DEGREE

Students with strong course work in other departments may consider a dual major. Students declare a primary and secondary major and after meeting requirements for both majors and earning 120 credits, will receive a Bachelor of Science degree with two majors listed on their diploma. Students should have an advisor in each Department. A dual degree requires that students earn 150 credits.

SECOND BACHELOR DEGREE IN ANIMAL SCIENCE

Students who have graduated from other majors at UMass Amherst or from other universities are eligible to apply for a second bachelor's degree. Most students accepted into this program in recent years are changing careers or completing courses required for application to veterinary school. The Department of Veterinary & Animal Sciences determines whether courses from the student's first degree meet major requirements. The University requires UMass Amherst graduates to take a minimum of 30 additional credits, and students who are graduates from other Universities take a minimum 45 additional credits. If the Department admits the student, a contract will be generated for the applicant based on the applicant's first degree transcript; Animal Science required courses and associated prerequisites. The chart below lists the Animal Science courses required for graduation. The courses for the Second Bachelor's Degree may require a number of prerequisites that are not listed in the chart below, including courses that may be needed for entry into veterinary, graduate, or other professional schools. See pages 13 through 16 for Animal Science major requirements and pages 18 and 19 for Pre-Veterinary major requirements.

Second Bachelor Degree Required Courses

Animal Science Courses	UMass Graduate credits	Non-UMass Graduate credits
ANIMLSCI 101 - Introduction to Animal Science	4	4
ANIMLSCI 103 - Introduction to Animal Management	4	4
ANIMLSCI 220 - Anatomy & Physiology of Domestic Animals	4	4
ANIMLSCI 285 - Cellular & Molecular Biology or BIOLOGY 285 or BIOCHEM 285	3	3
ANIMLSCI 260 - Animal Care and Welfare	4	4
ANIMLSCI 311 - Genetics or BIOLOGY 311 or BIOCHEM 311	3	3
ANIMLSCI 332 - Basic Animal Nutrition and Feeding	4	4
NATSCI 387 - CNS Junior Year Writing	3	3
ANIMLSCI 494GI/494PI/494TI – Integrative Experience	3	3
ANIMLSCI 472 - Infection and Immunity or ANIMLSCI 572 - Molecular Immunology	3 3	3 3
ANIMLSCI 521 - Physiology of Reproduction or ANIMLSCI 421 - Wildlife Reproduction	4 3	4 3
Prerequisites/Electives	Varies	Varies

TRANSFER STUDENTS

The University Office of Transfer Admissions and the Department of Veterinary & Animal Sciences (for some major required courses) establish the number of transfer credits and course equivalents based upon the transcript(s) received. Upon arrival, transfer students work closely with the Transfer Advisor. This aids in developing a curriculum plan tailored to the student's needs that will also minimize the time needed to meet the degree requirements. For instance, a student transferring as a junior may need to take one or more prerequisite classes before being able to take junior level major courses. It may be necessary to plan on extra semesters of course work to take other courses the student is interested in and also meet all graduation requirements. This depends on the student's previous major and the courses to be transferred since each transfer student's situation is unique.

Transfer Admissions Requirements

The primary criterion for transfer admission is the quality of the student's academic record. Other factors include the number of transfer credits, prerequisite coursework, type of completed courses, consistency of grades, and available space. Successful applicants are expected to have a 2.7 or higher minimum overall GPA in full-time academic college coursework across a range of disciplines, as well as recent enrollment with a 2.7 or higher minimum GPA in full-time academic coursework across a range of disciplines. Meeting the minimum criteria is no guarantee of admission since the university considers a variety of factors in predicting the academic success of applicants and in making admission decisions.

Prior to enrollment, all transfer applicants must have completed a college-level non-ESL composition course which fulfills the UMass Amherst writing requirement (exceptions may be made for students enrolled at foreign universities). All transfer students entering as juniors are also required to declare a major and then be admissible to that major in order to be accepted to UMass Amherst.

Priority consideration for admission is given to Massachusetts community college graduates who participate in the Joint Admissions or MassTransfer programs. More information about this program can be found at: http://www.umass.edu/admissions/apply/admissions-requirements/transfer-admissions-requirements

TRANSFERRING CREDITS

Prior approval is required for current students wishing to take credits at another institution and transfer them to UMass. Approval via the completion of the senior year in absentia form is required when a student intends to complete his/her final degree requirements at another institution, including any other UMass campus, or with CLEP credits. If the course a student wishes to transfer credits for is a major requirement, the student's academic faculty advisor must sign the "Prior Approval for Transfer Course Work" or "Completing Senior Year in Absentia" form. If the course is a Gen Ed requirement, the Office of transfer Admissions in the registrar's office must approve. Letter grades earned outside UMass do not transfer and are not used to calculate the UMass GPA but the credits do, if eligible. Transferred courses will not replace a C- or below earned at UMass. In order to graduate from UMass Amherst, all students must complete a minimum of 120 graduation credits (130-34 for Engineering) and all UMass Amherst/College/Major requirements with a minimum cumulative grade point average of 2.0 (overall and in their major) on a 4.0 scale. Up to 75 transfer or test credits may be applied to graduation requirements. Students are required to earn at least 45 credits in residence at UMass Amherst (at least 60 credits in residence if graduating with honors). All scores and transcripts must be sent to Undergraduate Admissions directly from the institution or testing agency. Transfer credit is generally awarded if your previous coursework is comparable in content and scope to courses offered by UMass Amherst and you earned a grade of C- (1.7) or higher in the course. Internships, co-ops, and technical, vocational, or highly specialized courses are generally not accepted for transfer credit. In the case of a non-traditional grading system, faculty evaluations must be submitted as part of your official transcript. Admitted freshmen who have supplied the relevant official transcripts will receive a transfer credit evaluation during their first semester. Admitted transfer students will receive a preliminary transfer credit evaluation with their admission package. A more detailed course and major evaluation will then take place during orientation. The Prior Approval for Transfer Course Work Form and the approval form for Completing Senior Year in Absentia can be found at: http://www.umass.edu/registrar/forms

EXCHANGE PROGRAMS

We welcome exchange students from other universities in the United States and around the globe. Students are also encouraged to participate in national and international exchange programs.

Exchange Students from other Universities - We would like to make your time in Veterinary & Animal Sciences a pleasant one. It is important that you meet with the faculty advisor assigned to you to ensure the classes your home university may have selected for you, or that you have selected, are appropriate. A short visit with your academic advisor can determine if you have taken the prerequisites needed for success in the classes selected. National Student Exchange for UMass Students – The on-campus UMass-Amherst Domestic Exchange is part of the National Student Exchange of about 160 colleges across the United States. With the assistance of your academic advisor, courses can be selected to meet Veterinary & Animal Sciences and University requirements so that you graduate with your class. You may also find courses not offered in UMass-Amherst that would enhance your

educational experience. Students normally select an exchange for their junior year. Applicants must be in good standing (GPA of 2.5) and make application for an exchange through the UMass-Amherst Domestic Exchange Office, 613 Goodell (413-545-5351) in the year prior to the exchange. Exchanges can be for one or two semesters at the same or different schools. The National Student Exchange web site is http://www.nse.org. Prior approval is required for students wishing to take credits at another institution and transfer them to UMass to meet degree requirements. The Prior Approval for Transfer Course Work Form is found at http://www.umass.edu/registrar/forms.

International Student Exchange for UMass students – can be arranged throughout the world. UMass has a long history of international involvement with other universities beginning with our third college president William S. Clark, who was instrumental in the development of, and the first president of Hokkaido University, Sapporo, Japan in 1876. Hokkaido University was started as an agricultural college and continues today as a sister university to UMass-Amherst. Today, exchanges involve over 80 college programs in 25 countries. International exchanges most often occur in the junior year. A grade point average of 3.0 and foreign language proficiency (in non-English speaking countries) is desired. Most courses taken (but not the grades) are transferable to our program and count towards residency credit requirements. See www.UMass.edu/ipo/ Prior approval is required for students wishing to take credits at another institution and Course Work Form can be found at http://www.umass.edu/registrar/forms

STUDENT SUPPORT SERVICES

College of Natural Sciences Academic Advising Office

The Associate Deans provide assistance with college career counseling and general academic policies and procedures including: late adds, withdrawals, repeat options, academic discipline, and referrals to other offices on campus. CNS Advising Center, 220 Morrill II, http://www.cns.umass.edu/students/academic-advising/cns-advising-center, 413-545-1969

A directory of campus student support services is available at http://www.umass.edu/studentlife Examples include:

- Dean of Students Office 227 Whitmore, 413-545-2684, http://www.umass.edu/dean_students/
- Financial Aid 243 Whitmore, 413-545-0801, http://www.umass.edu/umfa
- DuBois Library Reference Desk, 413-545-0150 http://www.library.umass.edu/ask/
- Learning Resource Center 10th Floor of DuBois Library, 413-545-5334 http://www.umass.edu/lrc
- Writing Center Learning Commons - Dubois Library, http://www.umass.edu/writingcenter/
- Biology Resource Center 372 Morrill IV 413-545-3631 http://www.bio.umass.edu/biology/bcrc
- Calculus Resource Center 110 LGRT (Lederle Tower)
- Chemistry Resource Center 151 Goessmann, 413-545-2195
- Physics Help Room 205 Hasbrouck
- Pre-Calculus Help Center 114 LGRT (Lederle Tower)
- Ombuds Office Campus Center 823, 413-545-0867, http://www.umass.edu/ombuds
- Center for Multicultural Advancement & Student Success CMass, Wilder Hall 413-545-2517, http://www.umass.edu/multiculturalaffairs/about/
- Committee for the Collegiate Education of Black & Other Minority Students (CCEBMS) 218 New Africa House, 413-545-0031 413-577-0980 http://www.umass.edu/native/nasss/
- United Asia Learning Resource Center (UALRC) Knowlton Building, 413-545-1844 http://www.umass.edu/ualrc/

LEARNING RESOURCE CENTER

The Learning Resource Center (LRC) located on the 10th floor of the W.E.B. Du Bois Library offers free academic support including: tutoring, supplemental instruction and media viewing facilities for many first and second year courses which students tend to find difficult. Tutors and Supplemental Instruction Leaders are model students trained to assist their peers in achieving academic success. Tutorial support is available on a walk-in basis; Monday through Thursday from 1:00 pm to 10:00 pm. During Supplemental Instruction (SI) sessions, students compare notes, discuss readings, develop organizational tools and predict test items. For more information: www.umass.edu/lrc/ or 413-545-5334.

ACADEMIC ADVISING

New student faculty advisors meet with students during orientation and introduce the students to the program and assist with registration for the students' first semester courses. Each student is assigned an academic advisor. Our department requires students to meet with their advisor during preregistration for courses in both the fall and spring semesters. Faculty advisors remove the students' academic advising hold at the time of the advising meeting. Students cannot register for classes if they do not meet with their academic advisor. Our Department encourages students to meet with their faculty advisor to seek advice about classes to take as well as selecting a career option or talking about other concerns. The faculty may be particularly helpful in providing guidance in the selection of appropriate courses consistent with the student's career goals. Each student's advisor is listed in the student center of the SPIRE account. Advisors' offices are listed on pages 39-41 of this handbook.

REGISTRAR

The Registrar's Office has a very comprehensive FAQ for UMass undergraduate students at http://www.umass.edu/registrar/faq

FINANCIAL AID SERVICES

Financial Aid Services strives to utilize all available resources to fill the gap that exists between family resources and the cost of a quality education. FAS takes a comprehensive approach to identifying financial aid programs to best meet the financial needs of students through federal, state and University funding. FAFSA help sessions are held on Thursdays 2:15-4:30pm in the CMass Office in Wilder Hall. The Financial Aid Services office is at 243 Whitmore, 413-545-0801, http://www.umass.edu/umfa

SCHOLARSHIPS

The Department of Veterinary & Animal Sciences offers the following scholarships:
Alvord Dairy, Anthony Borton, Brooks, Upton, Drew Memorial; Byron Colby, Richard Foley, J.D.W. French, Nilsson, Jay Pirog and Victor Rice scholarships. The Pearson Family scholarship supports the Winter Travelling Dairy program. Information about eligibility for each scholarship is available on the Department website https://www.vasci.umass.edu. Students must enroll in AcademicWorks, fill out both the UMass general application and the CNS application. AcademicWorks will automatically submit the student's application to the scholarships and awards for which the student is fully eligible and will inform the student of other scholarships for which additional materials are required in order to apply.

CAREER PLACEMENT AND JOB OPPORTUNITIES

The Campus Career Network maintains an office directly associated with the College of Natural Sciences to advise students in our majors. The office is located at Morrill II Building, Room 337, (413) 545-2238, njwatson@umass.edu, www.umass.edu/careers. This office seeks to directly aid students in the process of applying for jobs. Workshops are held at various locations on campus. Interviewing skills, resume writing, and job search strategies are emphasized. Students seeking aid in self-assessment and career goal changes are also encouraged to visit this office. Office staff can aid students in locating and organizing an internship or co-op experience. Veterinary & Animal Sciences awards credit for these activities. Your advisor can also help arrange internships; co-op and summer practicum contracts in conjunction with the Campus Career network.

Faculty members are very interested in your career success and are willing to write letters of recommendation for students they know from class work and/or advising. Advisors and other faculty members are willing to review letters of application and resumes for you and may also be aware of jobs that are available and help students with job placement. In recent years 25% of our graduates have entered veterinary, graduate or professional schools. Others develop careers in a variety of diverse occupations that include technicians in the biotechnology field, veterinary assistants, equitation instructors, stable managers, teachers, extension agents, agribusiness sales and service, government agencies and farming.

HANDSHAKE Join Handshake (https://umass.joinhandshake.com/), UMass Amherst's comprehensive database of internships and jobs, and where you will learn about all career-related events on campus.

DISABILITY SERVICES AND ACCOMMODATIONS

The Office of Disability Services promotes the empowerment of people with disabilities and their full integration into campus life by providing a wide variety of services to students with documented disabilities. Many accommodations are available at the University to ensure that students with disabilities have equal access to the educational and co-curricular processes, without compromising essential components of the curriculum. Accommodations are determined on an individual basis, based on the student's documentation. A "reasonable" accommodation refers to an accommodation that is appropriate as well as effective and efficient, and is agreed upon by the University and the consumer with a disability. Students are responsible for contacting Disability Services at the beginning of each semester so that reasonable accommodations can be made in a timely manner. The office is open from 8:30 a.m. to 5:00 p.m. on weekdays. Disability Services is located at 161 Whitmore Administration Building, Tel: (V/TTY): 413-545-0892, Fax: 413-577-0122, Please see Website: http://www.umass.edu/disability/students/accommodations-students for a description of each accommodation. The accommodations most frequently provided include, but are not limited to: Additional time to complete assignments, Alternate formats for printed course materials, Alternate types of exams, Assistive Technology, Captioning Services, Classroom access assistants, Document Conversion, Extended time on exams, Extension of Statute of Limitations, Exam Proctoring, Learning Specialists, Modification of graduation requirements, Note-taking services, Para-transit services, Prepared materials before Class, Reduced course load, Scribes, Sign language interpreters and Oral Transliterators and Tape Recorders.

UNIVERSITY HEALTH SERVICES (UHS)

UHS provides comprehensive primary medical care for adults and children, walk-in care, mental health care and many other services and programs. UHS' staff includes physicians who are board-certified in family practice, internal medicine, pediatrics and sports medicine; family nurse practitioners collaborate with physicians and provide a full range of primary care services. It is recommended that new students choose a UHS primary care provider and schedule a welcome appointment to get acquainted. Your primary care provider, or PCP, coordinates your health care and can refer you for services as needed. UHS services also include: a pharmacy, acupuncture, allergy shots, eye care, health promotion, HIV testing, immunizations, nutrition services, obstetrics and gynecology, optical services, orthopedics, pediatrics, physical therapy, radiology and ultrasound, sexual health, sports medicine, and alcohol and other drug risk prevention http://www.umass.edu/uhs/services/

Participation in BASICS is mandatory for students violating campus policies, cited by the police, or transported to the emergency room because of intoxication. Same-day appointments are available at UHS. Call 413-577-5101. If you don't know whether you should be seen, or if you have questions, call the UHS' Triage Advice Nurse, 413- 577-5229, during health center hours. For after-hours medical and mental health advice, call 413-577-5000. http://www.umass.edu/uhs/

Center for Counseling and Psychological Health - CCPH

Confidential services used by a quarter of the student population include stress reduction, crisis intervention, short-term therapy for individuals, couples and families, support and therapy groups, behavioral medicine, psychiatric services and an eating disorders clinic. Length of therapy varies, with a primary focus on short-term treatment directed at helping students function in a university environment. The student and therapist will determine the best approach for the student. CCPH does not have the capacity to manage chronic conditions requiring intensive or frequent contacts. If our short-term care model will not adequately meet the student's needs, the therapist will discuss referral resources with the student. Clinical services are strictly confidential. No information is released without your permission, except in extreme, life-threatening emergencies or when required by law. Emergency services are available 24/7 every day. During business hours - Monday – Friday, 8 a.m. – 5 p.m., call the CCPH at 413-545-2337. After 5 p.m., on weekends or holidays, call UHS, 413-577-5000, and ask for the CCPH clinician on-call. The main office is located at 127 Hills North, in the Central Residential Area. Facing the Hills building, look for the UHS Annex sign, next to the doorway on the far left side. Offices are also located at 123 Berkshire House, off Massachusetts Avenue. For more information go to http://www.umass.edu/counseling/

STUDENT RESOURCES AND ORGANIZATIONS

The Campus Pulse is the gateway to hundreds of campus activities, campus offices and more than 200 student organizations. Campus Pulse provides a daily calendar where students can find out about dozens of interesting campus events and activities. Through Campus Pulse, you can connect to a wide community that includes: Registered Student Organizations (RSOs), The Student Government Association (SGA), The Center for Student Development, The Student Activities & Involvement Center, and Residence Life. The groups include: community service organizations, student government, ethnic and cultural groups, religious and spiritual organizations, fraternity and sororities, student run businesses, media related groups, groups that grow from academic interests, and groups dedicated to athletics and recreation, socializing, arts and entertainment, and politics. Website: https://umassamherst.collegiatelink.net/

MOODLE- Moodle is the learning management system (LMS) at UMass Amherst; it is used to deliver course content and host online learning activities.
http://www.it.umass.edu/moodle

IT - Information Technologies

This office develops, maintains, and supports computing, instructional technology, and telecommunications services at UMass Amherst. The office is located in Lederle Graduate Research Center Lowrise & 101 University Drive, Help Desk 413-545-9400. The IT Help Center is the first point of contact for all IT clients with computer-related questions or problems. Website: http://www.it.umass.edu

SPIRE - Student Information System

Students should log on to SPIRE to monitor their progress by viewing their Academic Requirements Report, which shows courses completed, transfer courses accepted and what they were applied towards, grades and credit hours earned, as well as indicating outstanding University requirements. Before meeting with their departmental academic advisor, students should plan their classes and note all University Gen Ed requirements that are outstanding. The SPIRE website also gives students direct secure access to administrative data such as class schedules, grades, billing information and financial aid status. Students can use SPIRE to print out unofficial transcripts. To access SPIRE, students use the same username (Net ID) and password that they use for their UMass email account. Students should check their umass.edu email daily and update their SPIRE account information regularly with any changes in address, phone number, and non UMass e-mail address.

OURS - Office of Undergraduate Research and Studies

OURS is committed to helping students navigate electronic and print information regarding available research and scholarly opportunities, including the Five College Coastal & Marine NOAA Internship. For an extensive list of opportunities and a 1:1 consultation, please visit the Office of Undergraduate Research and Studies. Their office is located in room 1020 on the tenth floor of the W.E.B. DuBois Library. Tel. 413- 545-5334http://www.umass.edu/ours/

CMass - The Center for Multicultural Advancement and Student Success

CMass is comprised of four integrated functional areas: Academic Support, Student Development, Cultural Enrichment and Institutional Diversity. Using a student centered approach which values collaboration, dialogue and action, the programs and services offered engage first generation and ALANA (African, Latino/Latina, Asian and Native American) students and colleagues in courageous, inclusive and supportive learning experiences. The CMass office is located in Wilder Hall, 413-545-2517, http://www.umass.edu/cmass/about/

Ombuds - The Ombuds Office and Academic Honesty Office is available to all members of the University community to help resolve University-related conflicts impartially. Ombuds personnel listen, ask questions and help individuals weigh options. When appropriate, they offer informal mediation or facilitate communication. They serve as a neutral "process manager" for academic grievances and charges of academic dishonesty by coordinating the associated hearing processes. The Ombuds Office is located in the Campus Center Room 823, 413-545-0867, http://www.umass.edu/ombuds

FIVE COLLEGE INTERCHANGE

UMass Amherst full and part-time students, who meet specific criteria, are eligible to enroll in courses at Amherst, Hampshire, Mount Holyoke, and Smith Colleges. The criteria are: second semester freshman (or beyond), in good academic standing, registered in at least one 3-credit UMass course. (NOTE: Special Students, Continuing & Professional Education and Dual Enrollment Students are not eligible.) Students should access http://ualc.umass.edu/five_college_interchange/registration/ for specific step by step registration instructions, rules and regulations. The UMass Five College Interchange Office is located at 613 Goodell Building, Telephone 413-545-5352.

iCONS - Integrated Concentration in Science

The iCons program is composed of three courses (one per year) and a senior capstone project. iCons curriculum integrates scientific expertise across disciplines and provides students with collaborative learning experiences, discovery-based projects, leadership development, and multi-disciplinary analytical skills. iCons provides integrative science education in Biomedicine or Renewable Energy. It is an 18-credit academic program offered by the College of Natural Sciences. iCons does not replace a student's major, it enhances the major by giving the student an opportunity to work with an interdisciplinary team of students and apply knowledge to existing problems of global significance. Admission to iCons is limited and competitive. The required application can be found on the iCons website. http://www.cns.umass.edu/icons-program/about/the-icons-advantage

DEAN of STUDENTS OFFICE

Provides students with the support, resources and referrals they need to succeed at the university. Staff is available to answer general questions, advocate on behalf of students, and connect students and their families to campus resources. Services include:

- Serving as a single point of contact within the University for students and their families in time of crisis
- Consultation and referrals for students contemplating withdrawal from, or re-enrollment at, the University
- Implementing and monitoring the University Conduct Process
- Providing short-term, emergency loans for students
- Supporting students through the Massachusetts Residency Reclassification process
- Overseeing Off Campus Student Services, the University's Help Line, and the Student Services Committee

http://www.umass.edu/dean_students/

ANIMAL SCIENCE MAJORS RESIDENTIAL ACADEMIC PLAN - RAP provides a unique opportunity for first-year students who have been accepted into the Animal Science RAP to connect with other motivated Animal Science majors, meet faculty, and learn about opportunities within the Veterinary and Animal Sciences Dept. Students enrolled in this RAP will live together in Knowlton Hall in the Northeast residential area and will take a 1-credit seminar course in the fall semester of their first year designed to enhance their academic experience and promote a successful transition into the University.

PRE-VETERINARY AND ANIMAL SCIENCES CLUB

Members attain both organizational and professional skills through regular meetings and planned activities. The Club recognizes the importance of integrating the competent care of animals and the ability to work closely with people. Meetings are interactive and topic choices involve the constant input of club members. All UMass undergraduate students are welcome to join.

ANIMAL SCIENCE STUDENT PEER MENTORING GROUP

The Mentoring Group offers tutoring and social events including guest speakers, group dinners and movie nights. Meetings focus on various topics including tips on: developing good study habits and good note taking skills, lab courses, "surviving" on campus and campus life, the Commonwealth College, studying abroad, and how to get the best experience with animal management classes. Upper class VASCI students are matched with underclassmen; each mentor guides 3 to 4 mentees.

BAY STATE LIVESTOCK CLASSIC
Students are encouraged to participate in the annual student organized Bay State Livestock Classic show held in April each year. Students register for ANIMLSCI 297L and are taught through hands-on experience the grooming and showing of cattle, sheep, goats and horses.

NESA – Northeast Student Affiliate Division of the American Dairy Science Association Students from twelve Northeastern universities compete in: livestock judging, a quiz bowl, paper presentations and a competition in which students who are participating in original undergraduate research present their results.

EQUINE TEAMS – see page 17

DEGREE REQUIREMENTS & ELECTIVE COURSES

University General Education (GenEd) requirements - All students are required to complete the General Education experience. The purpose of the GenEd requirement is to stretch students' minds, broaden their experiences, and prepare them for: college experiences and subsequent professional training, careers and productive lives, community engagement and informed citizenship, a diverse and rapidly changing world, and a lifetime of learning. It is important that you plan your GenEd courses carefully with the help of your academic advisor so that you are choosing subjects that interest you and that will create a unifying experience for you. You do not need to complete your GenEd courses at the start of your college career; plan to distribute them throughout your four years.

Gen Ed courses cannot be taken on a pass/fail basis.

Gen Ed requirements are described at: https://www.umass.edu/gened/students/fulfilling-requirements.

Many Gen Ed requirements are automatically met by departmental major requirements. Freshman and transfer students entering in fall 2018 or later must take one of the two required Diversity Gen Ed courses (DU or DG designation) in their first year at UMass Amherst. Students who entered before fall 2018 must also take two Diversity Gen Ed courses (U, G, DU, or DG designation) during their time at UMass. Requirements for transfer students vary depending on whether they've completed the Mass Transfer Block (MTB) or the Commonwealth Transfer Compact (CTC) or transfer in Gen Ed equivalent courses. For most students entering as freshmen, the number of Gen Eds can be minimized to three by combining DU and DG designations with the other required Gen Ed designations that are not met automatically by departmental major requirements:

One 4 credit Gen Ed Historical Studies (HS)
One 4 credit Gen Ed Literature or Art (AL or AT)
One 4 credit Gen Ed Social & Behavioral (SB)

For example, students can fulfill their Gen Ed requirements by taking 3 classes: one HSDU in their first year, and then one ALDG and SB later. Students can track their Gen Ed requirements through their Academic Requirements Report (ARR) and Course Enrollment Planning Report (CEPR), available on the menu at the left hand side of their Student Center in SPIRE. Classes in the shopping cart will be listed in the CEPR under the appropriate Gen Ed requirement with a blue star icon, so that students can double-check that the course fulfills the requirement before they register. When checking the ARR or CEPR, it is important to note whether "Not satisfied" has changed to "Satisfied".

In addition to the three Gen Eds above, College writing (ENGLWRIT 112), Junior writing (NATSCI 387) and an Integrative Experience (IE) Gen Ed are required. The Junior writing and IE Gen Ed classes must be taken at UMass Amherst. The IE requirement can be fulfilled by either ANIMLSCI 494GI (spring) p.40 or ANIMLSCI 494PI (fall) p.40, or see pp. 25-27 for information on fulfilling the requirement with ANIMLSCI 499Y+T plus ANIMLSCI 494TI.

MAJOR COURSE REQUIREMENTS

Students are encouraged to evaluate their academic abilities and consider upgrading basic requirements to more advanced levels, which are required for entrance into professional and graduate schools. Advanced levels are in the "required for Pre-veterinary" column.

BASIC SCIENCE CORE	**Animal Science Major ***	**Pre-Veterinary Major**
Biology	BIOLOGY 151 & 152 & 153	BIOLOGY 151 & 152 & 153
General Chemistry	CHEM 111 & CHEM 112	CHEM 111 & CHEM 112
Organic Chemistry	CHEM 261 or CHEM 250	CHEM 261, 262 & 269
Math	MATH 101 & 102 or MATH 104	MATH 104 & MATH 127 or MATH 104 & MATH 131
Statistics	STATISTC 111 or STATISTC 240 or RESECON 212	STATISTC 111 or STATISTC 240 or RESECON 212
Microbiology	MICROBIOLOGY 310	MICROBIOLOGY 310
Microbiology Lab	ANIMLSCI 366 required for biotech concentration, option for animal management con.	ANIMLSCI 366 or MICROBIOLOGY 265 or MICROBIOLOGY 312
Biochemistry	BIOCHEM 420	BIOCHEM 420 or 423 OR BIOCHEM 423 & 424
Physics	None	PHYSICS 131 & 132
ANIMAL SCIENCE CORE	**Animal Science Major * Common required courses**	**Pre-Veterinary Major**
Intro to Animal Science w/lab	ANIMLSCI 101 with lab	ANIMLSCI 101 with lab
Intro to Animal Mgmt. w/lab	ANIMLSCI 103 with lab	ANIMLSCI 103 with lab
Anatomy & Physiology w/lab	ANIMLSCI 220 with lab	ANIMLSCI 220 with lab
Cellular & Molecular Biology	ANIMLSCI 285 or BIOLOGY 285 or BIOCHEM 285	ANIMLSCI 285 or BIOLOGY 285 or BIOCHEM 285
Animal Care & Welfare	ANIMLSCI 260	ANIMLSCI 260
Genetics	ANIMLSCI 311 or BIOLOGY 311 or BIOCHEM 311	ANIMLSCI 311 or BIOLOGY 311 or BIOCHEM 311
Animal Nutrition/Feeding w/lab*	ANIMLSCI 332* or 333* with lab	ANIMLSCI 332 with lab
Careers in Animal Science	ANIMLSCI 392A	none
CNS Junior Year Writing	NATSCI 387	NATSCI 387
Infection & Immunology* or Molecular Immunology or Equine Diseases	ANIMLSCI 472* or ANIMLSCI 572* or ANIMLSCI 373*	ANIMLSCI 472 or 572
Wildlife Reproduction or Physiology of Reproduction	ANIMLSCI 421 or ANIMLSCI 521 with lab	ANIMLSCI 521 with lab
Integrated Experience	ANIMLSCI 494GI OR ANIMLSCI 494PI OR 494TI AND 499Y & 499T (honors thesis)	ANIMLSCI 494GI OR ANIMLSCI 494PI OR 494TI AND 499Y & 499T (honors thesis)

***Additional or alternate requirements apply to each Animal Science concentration.**
See page 13 for Animal Biotechnology & Research Concentration Suggested Sequence of Classes.
See page 14 for Animal Science Major - Animal Management Concentration Suggested Sequence of Classes.
See page 16 for Animal Science Major – Equine Science Concentration Suggested Sequence of Classes.

SEQUENCE OF COURSES

Animal Science majors entering in Fall 2014 (or later) must complete courses necessary for a concentration in **Animal Biotechnology & Research** or **Animal Management** or **Equine Science.** Skills will include genetics techniques that allow farmers to make decisions about breeding to increase production or prevent diseases. Health skills will include: understanding the principles of vaccination, administration of pharmaceuticals to treat infections by bacteria and parasites, testing for infection, principles related to reproduction such as semen analysis and storage and in vitro fertilization and cloning, nutritional analysis of feed from various sources and diet construction for various breeds. Students also have the opportunity to work in the laboratories of scientists who study problems related to agricultural animal health and reproduction.

Animal Science Major - Animal Biotechnology & Research Concentration
Suggested Sequence of Classes

Freshman Year			
ANIMLSCI 101 - Intro Animal Science	4	**ANIMLSCI 103** - Intro Animal Management	4
BIOLOGY 151 - Intro Biology I	4	**BIOLOGY 152/153** - Intro Biology II/lab	5
MATH 104 - Pre-Calculus	3	**CHEM 111** - General Chemistry I *****	4
General Education Class – DG or DU	4	**ENGLWRIT 112** - College Writing	3
First Year Freshmen Seminar or RAP	1		
Total	16	Total	16
Sophomore Year			
ANIMLSCI 220 - Anatomy & Physiology	4	**ANIMLSCI 285** - Cellular & Molecular Biol	3
ANIMLSCI 260 - Animal Welfare -GenEd	4	**CHEM 250 or CHEM 261** -Organic Chem	3
CHEM 112 - General Chemistry II	4	**General Education Class**	4
STATISTC 240 or STATISTC 111 Statistics **or RESECON 212 or GenEd**	3/4	**STATISTC 240 or STATISTC 111** Statistics **or RESECON 212 or GenEd**	3/4
		ANIMLSCI 392A - Career Seminar	1
Total	15/16	Total	14/15
Junior Year			
ANIMLSCI 311 - Genetics	3	**ANIMLSCI 332** - Animal Nutrition & lab	4
MICROBIOLOGY 310 - Microbiology	3	**BIOCHEM 420** - Biochemistry	3
ANIMLSCI 472 Infection & Immunity **or ANIMLSCI 572 –**Molecular Immunology (spring semester)	3	**ANIMLSCI 572 –**Molecular Immunology **or ANIMLSCI 472** Infection & Immunity (fall semester)	3
ANIMLSCI 365 – Fundamentals in Veterinary & Biomedical Techniques Lab	3	**NATSCI 387**- CNS Junior Writing or **Elective or General Education Class**	3 4
ANIMLSCI 391C or 391M - Biotechnology Research Experience II OR **ANIMLSCI 386** – Veterinary Oncology OR **ANIMLSCI 390E** - Fundamental Vertebrate Embryology	2-3	**ANIMLSCI 391C or 391M -** Biotechnology Research Experience II OR **ANIMLSCI 386** – Veterinary Oncology OR **ANIMLSCI 390E** - Fundamental Vertebrate Embryology	2-3
Total	14-15	Total	15-17
Senior Year			
ANIMLSCI 494PI – IE: Advanced Animal Health & Management or **ANIMLSCI 494GI** - IE: Good Intentions (spring sem.)	3	**ANIMLSCI 494GI** - IE: Good Intentions or **ANIMLSCI 494PI** – IE: Advanced Animal Health & Management (fall semester)	3
ANIMLSCI 491C OR **ANIMLSCI 491M** - Biotechnology Research Experience III	3	**ANIMLSCI 421** – Wildlife Reproduction **OR ANIMLSCI 521** - Physiology of Reproduction with lab	3 4
ANIMLSCI 455 - Research Animal Management I	4	**ANIMLSCI 456 -** Research Animal Management II	3
ANIML SCI 366 - Veterinary Microbiology (fall or spring semester) or **Elective**	2/ 4	**ANIML SCI 366 -** Veterinary Microbiology (fall or spring semester) or **Elective**	2 4
NATSCI 387-CNS Junior Writing or **Elective**	3/4	**NATSCI 387**-CNS Junior Writing or **Elective**	3/4
Total	15-18	Total	14-18

***** To enroll in CHEM 111 students must complete Math 104 or score 20 on Part A of Math placement test

Students have opportunities to interact with other undergraduate students, graduate students and post-doctoral fellows in the research setting. Journal Clubs are held weekly within the department. Labs also hold weekly meetings where students have the opportunity to present their research to other lab members and once a year the department holds a Science Day where students present their work to the faculty and students of the department. Students who achieve a significant amount in their research have the opportunity to present at regional, state and national scientific meetings where they interact with other undergraduate students, graduate students, veterinarians and faculty including those from colleges of veterinary medicine in the USA and abroad. In the summer, as well as during the academic year, there are a number of fellowship programs that provide monetary rewards to research students who are accepted into the program along with the opportunity to visit laboratories across campus and meet and interact with other students and faculty in those labs.

Animal Science Major - Animal Management Concentration

Suggested Sequence of Classes

Freshman Year			
ANIMLSCI 101 - Intro Animal Science	4	**ANIMLSCI 103** - Intro Animal Mgmt	4
BIOLOGY 151 - Intro Biology I	4	**BIOLOGY 152/153** - Intro Biology II/lab	5
MATH 104 - Pre-calculus	3	**CHEM 111** - General Chemistry I *****	4
General Education Class – DG or DU	4	**ENGLWRIT 112** - College Writing	3
First Year Freshmen Seminar or RAP	1		
Total	16	Total	16
Sophomore Year			
ANIMLSCI 220 - Anatomy & Physiology	4	**ANIMLSCI 285** – Molecular & Cellular Bio	3
ANIMLSCI 260-Animal Welfare - GenEd	4	**CHEM 250** or **CHEM 261** Organic Chem	3
CHEM 112 - General Chemistry II	4	**General Education Class**	4
STATISTC 240 or STATISTC 111 Statistics **or RESECON 212 or GenEd**	3/4	**STATISTC 240 or STATISTC 111** Statistics **or RESECON 212 or GenEd**	3/4
		ANIMLSCI 392A - Careers Seminar	1
Total	15/16	Total	14/15
Junior Year			
ANIMLSCI 311 - Genetics	3	**ANIMLSCI 332** - Animal Nutrition & lab **OR ANIMLSCI 333-** Equine, Cattle and Companion Animal Nutrition (fall sem.)	4
ANIMLSCI 472 Infection & Immunity **or ANIMLSCI 572 –**Molecular Immunology (spring semester)	3	**ANIMLSCI 572 –**Molecular Immunology **or ANIMLSCI 472** Infection & Immunity (fall semester)	3
MICROBIO 310 - Microbiology	3	**ANIMLSCI 320 -** Animal Business Mgt.	3
BIOCHEM 420 – Biochemistry (fall or spring semester) **or GenEd or Elective**	3/4	**NATSCI 387** - CNS Junior Writing OR **GenEd** OR **Elective**	3/4
Additional Requirements see below	varies	**Additional Requirements** see below	varies
Total	varies	Total	varies
Senior Year			
ANIMLSCI 494PI – IE: Advanced Animal Health & Management OR **ANIMLSCI 494GI** - IE: Good Intentions (spring semes.)	3	**ANIMLSCI 494GI** - IE: Good Intentions or **ANIMLSCI 494PI** – IE: Advanced Animal Health & Management (fall semes.)	3
NATSCI 387 - CNS Junior Writing OR **Elective**	3/4	**ANIMLSCI 421** – Wildlife Reproduction **OR ANIMLSCI 521**-Physiology of Reproduction with lab	3 4
Additional Requirements see below	varies	**Additional Requirements** see below	varies
Total	varies	Total	varies

***** To enroll in CHEM 111 students must complete Math 104 or score 20 or better on Part A of Math test

Animal Management Concentration Additional Requirements – continued on page 15

I. Complete One Lab Course from the list below:

- ANIMLSCI 365 – Fundamentals in Veterinary and Biomedical Laboratory Techniques - 3 credits Fall sem.
- ANIMLSCI 366 – Veterinary Microbiology Lab - 2 credits Fall and Spring semesters
- ANIMLSCI 386 – Veterinary Oncology – 2 credits Fall and Spring semesters
- ANIMLSCI 390E - Fundamental Vertebrate Embryology Spring semester
- BIOCHEM 421 – Elementary Biochemistry Lab - 2 credits Fall semester

II. Complete 8 credits from the list below:

- ANIMLSCI 231 - Dorset Sheep Management I 2 credits
- ANIMLSCI 251 - Dorset Sheep Management II 2 credits
- ANIMLSCI 232 - Belted Galloway Management I 2 credits
- ANIMLSCI 252 - Belted Galloway Management II 2 credits
- ANIMLSCI 233 - Boer Goat Management I 2 credits
- ANIMLSCI 253 - Boer Goat Management II 2 credits
- ANIMLSCI 234 - Poultry Management I 2 credits
- ANIMLSCI 254 - Poultry Management II 2 credits
- ANIMLSCI 236 - Equine Management I 2 credits
- ANIMLSCI 256 - Equine Management II 2 credits
- ANIMLSCI 297DC - Dairy Calf Management I 2 credits
- ANIMLSCI 297D - Dairy Calf Management II 2 credits
- ANIMLSCI 455 - Research Animal Management I 4 credits
- ANIMLSCI 456 - Research Animal Management II 3 credits

Animal Management Concentration Additional Requirements continued from page 14

III. Complete 3 credits from the list below

ANIMLSCI 291C - Biotech Research – Cellular and Molecular I 1 credit
ANIMLSCI 291M - Biotech Research – Animal Models 1 credit
ANIMLSCI 296T - Intro to Teaching in Animal Science 1-2 credits
ANIMLSCI 297B - Artificial Insemination AI Certification (Spring Break) 1 credit
ANIMLSCI 297L – Bay State Livestock Classic 1 credit
ANIMLSCI 297P – Bay State Livestock Classic Management & Coaching 2 credits
ANIMLSCI 301 – Equine Behavior and Learning Theory 3 credits
ANIMLSCI 373 - Equine Diseases & Health Management 3 credits
ANIMLSCI 391C - Biotech Research – Cellular and Molecular II 2 credits
ANIMLSCI 391M - Biotech Research – Animal Models II 2 credits
ANIMLSCI 396T - Intermediate Teaching in Animal Science 1-2 credits
ANIMLSCI 398D – Service Dog Training 3 credits
ANIMLSCI 398S – Equine Enterprise 3 credits
ANIMLSCI 401 – Management of the Equine Athlete 3 credits
ANIMLSCI 432 - Advanced Nutrition 3 credits
ANIMLSCI 445A - Equine Reproduction Lab 1 credit
ANIMLSCI 454 - Dairy Herd Management 4 credits with lab
ANIMLSCI 491C - Biotech Research – Cellular and Molecular III 3 credits
ANIMLSCI 491M - Biotech Research – Animal Models III 3 credits
ANIMLSCI 496T - Advanced Teaching in Animal Science 1-2 credits
ANIMLSCI 497L - Winter Travelling Dairy (Winter Break) 1 credit

Recommended Electives

DOMESTIC ANIMAL MANAGEMENT - courses recommended for students interested in a career related to FARMING

RESECON 103 - Microeconomics (3 credits) Spring semester
STOCKSCH 105 - Soil (3 credits), pre-requisite for STOCKSCH 350 Spring sem.
STOCKSCH 201 - Equipment Operations (2 credits) Spring semester
STOCKSCH 211 - Pasture Management (3 credits) Fall semester
STOCKSCH 350 - Sustainable Soil & Crop Management (3 credits) Fall semester
MANAGMNT 241 - New Venture Creation (GenEd) (4 credits) Spring semester

NON-DOMESTIC ANIMAL MANAGEMENT - courses recommended for students interested in a career related to WILDLIFE, ZOO, or EXOTIC animals

BIOLOGY 497AM ST – Animal Movement
BIOLOGY 540 - Herpetology (4 credits) with lab Spring semester
BIOLOGY 544 - Ornithology (4 credits) with lab Spring semester
BIOLOGY 550 - Animal Behavior (4 credits) with lab Spring semester
NRC 260* - Fish Conservation and Management (3 credits) Fall semester
NRC 261* - Wildlife Conservation (3 credits) Spring semester
NRC 390E - Evolution & Conservation (3 credits) Spring semester
NRC 563 - Wetlands, Wildlife Ecology & Management (3 credits) Spring semester
NRC 564 - Wildlife Habitat Management with lab (4 credits) Fall semester
NRC 565- Wildlife Population Dynamics and Management - (4 credits) Fall semester
NRC 570 - Ecology of Fish with lab - (4 credits) Fall semester
NRC 571 - Fisheries Science & Management with lab- (4 credits) Spring semester
NRC 586 - Natural Resource Inventory of Local Lands - (3 credits) Spring semester
NRC 590AE - Aquatic Ecology with lab - (4 credits) Fall semester
NRC 597CB ST- Conservation and Animal Behavior (3 credits) Fall semester
NRC 597 RE ST - Restoration Ecology (3 credits) Spring semester
NRC 597F - Conservation Genetics (3 credits) - NRC 597FL - Lab
*NRC 260 & NRC 261 and three more of the NRC courses listed here are required to declare a minor in Natural Resources Conservation.

TEACHING - recommended for students interested in a career related to teaching

ANIML SCI 296T, 396T - Introduction to Teaching Animal Science (1-2 credits) both sem.
HUMANDEV 270 - Child Development (4 credits) Spring semester
PSYCH 350 - Developmental Psychology (3 credits) Fall semester
PSYCH 355 - Adolescent Psychology (3 credits) Spring semester
EDUC 497I ST - Tutoring in Schools (3 credits) both semesters
EDUC 524 - Working with Middle School & High School Teachers (3 credits) Spring

Animal Science Major – Equine Science Concentration

Suggested Sequence of Classes

Freshman Year			
ANIMLSCI 101 - Intro Animal Science	4	**ANIMLSCI 103** - Intro Animal Mgmt	4
BIOLOGY 151 - Intro Biology I	4	**BIOLOGY 152/153** - Intro Biology II/lab	5
MATH 104 - Pre-calculus	3	**CHEM 111** - General Chemistry I *****	4
Diversity General Education Class AI/AT/SB/HS/I + DG or DU(first year)	4	**ENGLWRIT 112** - College Writing	3
First Year Freshmen Seminar OR RAP	1	**[MATH 127** – Calculus Prereq for business classes & vet school]	[3]
Total	16	Total	16[19]
Sophomore Year			
ANIMLSCI 220 - Anatomy & Physiology	4	**ANIMLSCI 285**– Molecular & Cellular Bio.	3
ANIMLSCI 260-Animal Welfare - GenEd	4	**CHEM 250** or **CHEM 261** Organic Chem	3
CHEM 112 - General Chemistry II	4	**General Education Class**	4
STATISTC 240 or STATISTC 111 Statistics **or RESECON 212 or GenEd**	3/4	**STATISTC 240 or STATISTC 111** Statistics **or RESECON 212 or GenEd**	3/4
ANIMLSCI 236 - Equine Management I	2	**ANIMLSCI 256 -** Equine Management II	2
Total	17/18	Total	15/16
Junior Year			
ANIMLSCI 311 - Genetics	3	**ANIMLSCI 320 -** Animal Business Mgt.	3
****ANIMLSCI 301** – Equine Learning and Behavior	3	****ANIMLSCI 302** - Development and Training of the Horse	3
ANIMLSCI 373 - Equine Diseases OR ANIMLSCI 472 or ANIMLSCI 572 (Spring)	3	**Business Elective OR GenEd**	3/4
BIOCHEM 420 - Biochemistry	3	**MICROBIO 310** - Microbiology	3
ANIMLSCI 333 – Equine, Cattle, and Companion Animal Nutrition OR ANIMLSCI 332 Animal Nutrition (Spring sem.)	4	**ANIMLSCI 392A -** Careers in Animal Science	1
Total	16	Total	13/14
Senior Year			
****ANIMLSCI 401 -** Management of the Equine Athlete	3	****ANIMLSCI 402 -** Equine Rehabilitation	3
ANIMLSCI 494PI – IE: Advanced Animal Health & Management OR **ANIMLSCI 494GI** - IE: Good Intentions (spring semester) OR Elective	3	**ANIMLSCI 494GI** - IE: Good Intentions or **ANIMLSCI 494PI** – IE: Advanced Animal Health & Management (fall semester)	3
NATSCI 387 - CNS Junior Writing	3	**ANIMLSCI 421** – Wildlife Reproduction	3
General Education Class	4	*****ANIMLSCI 445A -** Equine Reproduction Lab	1
Elective	3/4	**Elective**	3/4
Total	16/17	Total	13/14
***** To enroll in CHEM 111 students must complete Math 104 or score 20 or better on Part A of Math test			

** A minimum of 6 credits in the ANIMLSCI 301/302 or ANIMLSCI 401/402 series is required, which is fulfilled by taking either of the two series.
See pages 33-41 for Animal Science course descriptions and pre-requisites

*** Laboratory Requirement - take a minimum of 1 credit; choose from the following:

ANIMLSCI 445A Equine Reproduction Lab	1 credit (Spring)
ANIMLSCI 365 Fundamentals in Veterinary & Biomedical Lab Tech.	3 credits (Fall)
ANIMLSCI 366 Veterinary Microbiology Lab	2 credits (Fall & Spring)
ANIMLSCI 386 Veterinary Oncology	2 credits (Fall & Spring)
ANIMLSCI 390E Fundamental Vertebrate Embryology	3 credits (Spring)

Animal Science Major – Equine Science Concentration

Recommended Gen Ed: RESECON102/ECON 103 (Gen Ed SB)
Recommended electives:
ANIMLSCI 398S Equine Enterprise I
ANIMLSCI 498S Equine Enterprise II
RESECON 162 Consumer in Our Society (no prerequisites)
RESECON 262 Environmental Economics (online)
RESECON 263 Natural Resource Economics (GenEd SB)
MANAGEMENT 241 New Venture Creation
MANAGEMENT 301 Principles of Management (online)
RESECON 314 Financial Analysis for Consumers and Firms (prereq RESECON 102/ ECON 103 AND MATH 127, 10 seats available for non-Resource Economics majors)
RESECON 324 Small Business Finance (Prereq. RESECON 102/ECON 103 AND RESECON 314)
ACCOUNTG 221 Principles of Financial Accounting (online)
MARKETING 301 Fundamentals of Marketing (online)
STOCKSCH 105 - Soil (3 credits), pre-requisite for STOCKSCH 350 Spring sem.
STOCKSCH 201 - Equipment Operations (2 credits) Spring semester
STOCKSCH 211 - Pasture Management (3 credits) Fall semester
STOCKSCH 350 - Sustainable Soil & Crop Management (3 credits) Fall semester

Equine students gain experience and build professional contacts through our internship program, career seminars, and industry association events. Internships are available with show barns, veterinary clinics, breed associations, farriers, equine nutritionists, chiropractors, marketing firms, saddle fitters, equine rehabilitation specialists, therapeutic riding centers, equine science teachers, and equine magazines. Example of past internships include Smartpak, Blue Seal Nutrition, Fairfield Equine Hospital, Friesians of Majesty, Cater Stables, High Hopes Therapeutic Riding Center, and Return to Freedom Mustang Sanctuary.

First Year Freshmen Seminar – FFYS 191ANML4 Exploring the Biology and Behavior of the Horse This seminar will explore the biology of today's domestic horse by investigating the evolution, behavior, and intelligence of these remarkable animals. We will discuss the origins, expansion, and management of the domestic horse and investigate the many different breeds that have developed over time. The biology of wild horses and other Equus species (zebras and donkeys) will also be examined. Students will have the opportunity to work with horses at the UMass Hadley Farm.

Hunter Seat Equestrian Team (IHSA) – The UMass Equestrian Team is a co-ed intercollegiate team. The team rides at the Umass Hadley Farm and competes in five show per semester, including invitational tournaments. Competitions are split into eight levels ranging from beginner walk-trot to open, with riders competing on the flat and over fences. Coach: Dani Corkill, danicorkill@comcast.net, 413-537-1162

Dressage Team (IDA) – The UMass Dressage Team is a co-ed intercollegiate team and has four shows per semester. Competitions are split into four levels ranging from intro to first level. The Dressage Team is a registered student organization at UMass and rides at Muddy Brook Farm in Amherst. Coach: Kathy Roberts muddybrookfarm@comcast.com

Western Team (IHSA) - The UMass Western Team is a co-ed intercollegiate team and has four shows per semester. Competitions are split into six levels ranging from beginner western horsemanship to open reining. The Western Team is a registered student organization at UMass. The team rides at Michele Carver performance Horses in Broad Brook, Connecticut. Coach: Michele Carver mcph279@gmail.com

Polo Team – The UMass Polo team is an intercollegiate club. The team competes against teams throughout the Northeast and in the spring regional tournament. The polo club rides privately owned polo ponies at Sone Pony Farm in Leverett, Massachusetts. The polo club is a registered student organization at UMass. Coach: Hilary Blythe 413-548-9922

Equine Shows & Clinics held at UMass

UMass Equitation Team Home Shows – Fall & Spring semesters
American Hanoverian Inspection – October
United States Dressage Federation – Level I Breed Show – August & September
Friesian Keuring – September
KWPN-NA (Dutch Warmblood) Keuring – September

Pre-Veterinary Science Major - Suggested Sequence of Classes

Freshman Year			
ANIMLSCI 101 - Intro Animal Science	4	**ANIMLSCI 103** - Intro Animal Mgmt.	4
BIOLOGY 151 - Intro Biology I	4	**BIOLOGY 152/153** - Intro Biology II/lab	5
CHEM 111 - General Chemistry I *****	4	**CHEM 112** - General Chemistry II	4
General Education Class–DG or DU	4	**ENGLWRIT 112** - College Writing	3
First Year Freshmen Seminar or RAP	1		
Total	17	Total	16
Sophomore Year			
ANIMLSCI 220 - Anatomy & Physiology	4	**ANIMLSCI 285** - Cellular & Molecular Bio	3
ANIMLSCI 260 - Animal Welfare GenEd	4	**CHEM 262/269** - Organic Chemistry	5
CHEM 261 - Organic Chemistry	3	**General Education Class**	4
MATH 127/131 - Calculus **or STATISTC 240 or STATISTC 111** Statistics **or RESECON 212**	3/4	**MATH 127/131** - Calculus **STATISTC 240 or STATISTC 111** Statistics **or RESECON 212**	3/4
Total	14/15	Total	15/16
Junior Year			
ANIMLSCI 311 - Genetics	3	**ANIMLSCI 332** – Nutrition & lab	4
ANIMLSCI 472 Infection & Immunity **or ANIMLSCI 572 –**Molecular Immunology (spring semester)	3	**ANIMLSCI 572 –**Molecular Immunology **or ANIMLSCI 472** Infection & Immunity (fall semester)	3
BIOCHEM 420 or 523 - Biochem I**	3	**Elective+ OR BIOCHEM 524**– Biochem II**	3
Elective+/ ANSCI '91C OR **ANSCI '91M** - Biotech Research Experience	1-3	**Elective+/ ANSCI '91C** OR **ANSCI '91M** - Biotech Research Experience	1-3
General Education Class or **Elective+** or **NATSCI 387** - CNS Junior Writing	4/3	**General Education Class** or **Elective+** or **NATSCI 387** - CNS Junior Writing	4/3
MICROBIO 310 – Microbiology (fall or spring)	3	**MICROBIO 310** – Microbiology (fall or spring)	3
Total	13-19	Total	14-20
Senior Year			
Elective+ or **NATSCI 387** - CNS Junior Writing	4/3	**ANIMLSCI 521** - Physiology of Reproduction with lab	4
PHYSICS 131 - Physics I with lab	4	**PHYSICS 132 –** Physics II with lab	4
ANIML SCI 366 –Veterinary Microbiology Lab or MICROBIO 265 (fall or spring sem.)	2	**ANIMLSCI 366-**Veterinary Microbiology Lab or MICROBIO 265 (fall or spring sem.)	2
ANIMLSCI 494PI – IE: Advanced Animal Health & Management OR **ANIMLSCI 494GI** - IE: Good Intentions (spring sem.) OR AnSci 494TI (with AnSci 499T)	3	**ANIMLSCI 494GI** - IE: Good Intentions OR AnSci 494TI (with AnSci 499T) OR **ANIMLSCI 494PI** – IE: Advanced Animal Health & Management (fall sem.)	3
Elective+ OR ANIMLSCI '91C OR **ANIMLSCI '91M** - Biotech Research Experience (1-3 credits) **OR** 499Y Honors thesis (3 credits)	1-3	**Elective+ OR ANIMLSCI '91C** OR **ANIMLSCI '91M** - Biotechnology Research Experience (1-3 credits) **OR** 499T Honors thesis (3 credits)	1-3
Total	13-16	Total	14-16

***** To enroll in CHEM 111 students must complete Math 104 or score 20 on Part A of Math placement test

******Biochem 423/424 series provides an in-depth biochemistry knowledge base that is preferred by many graduate and professional schools. Biochem 420 is the minimum requirement for graduation with a BS-Pre-Vet degree.

+ Animal Science electives are listed on pages 33-41, other suggested electives are listed on pages 20-21

Students planning to apply to veterinary schools should have three Veterinary Medical Related Experiences of at least 200 hours each, chosen from the following four areas: a) Large animal, b) Small animal, c) Wildlife/conservation, d) Laboratory research. Veterinary schools prefer applicants with an open mind about animal species since their mission is to teach the material that you will be tested on when taking the Veterinary Licensing Exam. Thus, it is a mistake to have two or three out of the three experiences centered on small animals or horses, even if you will specialize as a veterinarian. Conversely, if you are interested in a veterinary specialty

Continued on page 19

Pre-Veterinary Science Major – Suggested Sequence of Classes (if deferring Chemistry)

Freshman Year			
ANIMLSCI 101 - Intro Animal Science	4	**ANIMLSCI 103** - Intro Animal Mgmt.	4
BIOLOGY 151 - Intro Biology I	4	**BIOLOGY 152/153** - Intro Biology II/lab	5
MATH 104 - Pre Calculus	3	**CHEM 111** - General Chemistry I *	4
General Education Class – DG or DU	4	**ENGLWRIT 112** - College Writing	3
First Year Freshmen Seminar or RAP	1		
Total	16	Total	16
Sophomore Year			
ANIMLSCI 220 - Anatomy & Physiology	4	**ANIMLSCI 285** – Cell. & Molec. Biol.	3
ANIMLSCI 260 - Animal Welfare GenEd	4	**CHEM 261** - Organic Chemistry	3
CHEM 112 - General Chemistry II	4	**STATISTC 240 or STATISTC 111** Statistics **or RESECON 212**	3/4
MATH 127/131 - Calculus	3	**General Education Class**	4
Total	15	Total	13/14
Junior Year			
ANIMLSCI 311 - Animal Genetics	3	**ANIMLSCI 332** - Animal Nutrition & lab	4
ANIMLSCI 472 Infection & Immunity **or ANIMLSCI 572 –**Molecular Immunology (spring)	3	**ANIMLSCI 572 –**Molecular Immunology **or ANIMLSCI 472** Infection & Immunity (fall)	3
CHEM 262/269 - Organic Chemistry	5	**PHYSICS 131** - Physics I with lab	4
General Education Class or **Elective+** or **NATSCI 387** - CNS Junior Writing	4/3	**GenEd** or **Elective+** or **NATSCI 387** - CNS Junior Writing	4/3
Elective+/ ANSCI '91C OR **ANSCI '91M** - Biotech Research Experience	1-3	**Elective+/ ANSCI '91C** OR **ANSCI '91M** - Biotech Research Experience	1-3
MICROBIO 310 - Microbiology	3		
Total	15-18	Total	15-18
Senior Year			
ANIMLSCI 366 - Veterinary Microbiology Lab or MICROBIO 265 (fall or spring sem.)	2	**ANIMLSCI 366** Veterinary Microbiology Lab or MICROBIO 265 (fall or spring sem.)	2
PHYSICS 132 – Physics II with lab	4	**ANIMLSCI 521** - Physiology of Repro	4
BIOCHEM 420 or 523 -Biochem I**	3	**Elective+ OR BIOCHEM 524** Biochem II **	3
ANIMLSCI 494PI – IE: Advanced Animal Health & Management OR **ANIMLSCI 494GI** - IE: Good Intentions (spring semester) OR AnSci 494TI (with AnSci 499T)	3	**ANIMLSCI 494GI** - IE: Good Intentions OR **ANIMLSCI 494PI** – IE: Advanced Animal Health & Management (fall semes.) OR AnSci 494TI (with AnSci 499T)	3
Elective+ OR ANSCI '91C OR **ANSCI'91M** - Biotech Research Experience (1-3 credits)/ 499Y Honors thesis (3 credits)	1-3	**Elective+ OR ANSCI '91C** OR **ANSCI '91M** - Biotech Research Experience (1-3 credits)/ 499T Honors thesis (3 credits)	1-3
Total	13-15	Total	13-15
***To enroll in CHEM 111 students must complete Math 104 or score 20 on Part A of Math test			
** Biochem 423/424 series provides an in-depth biochemistry knowledge base that is preferred by many graduate and professional schools. Biochem 420 is the minimum requirement for graduation with a BS-Pre-Vet degree.			
+ Animal Science electives are listed on pages 33-41, other suggested electives are listed on pages 20-21			

Continued from page 18 (e.g. zoo medicine), make sure you gain experience in that area. These experiences can be pursued during the school year or in the summer. Summer experiences may also be more exotic (i.e. internship at an aquarium). These experiences are required so that the veterinary colleges are assured that you have a comprehensive grasp of the veterinary medical profession and so that you can cultivate contacts who will write superlative letters of recommendation for you. Be sure to document your experiences so that you can fill in details on your veterinary school applications years later. See pages 28-32 for information on applying to veterinary colleges.

ADDITIONAL ELECTIVE COURSES

Students may choose elective courses from course offerings in other departments. This list is informational only. Students should check all prerequisites and note that some classes are only offered in the Spring or Fall semester and some are only offered alternate years. Students may need to secure the instructor's permission. Students should consult with their advisor before choosing courses that are not listed.

Primate Behavior	ANTHRO 317
Elementary Biochemistry Lab	BIOCHEM 421
Marine Vertebrate	BIOLOGY 273
Evolution: Diversity of Life Through Time	BIOLOGY 280
General Genetics	BIOLOGY 283
Introduction to Ecology	BIOLOGY 287
Animal Movement	BIOLOGY 497AM ST
Interpersonal Communications	COMM 250
Public Speaking	COMM 260
Introduction to Microeconomics	ECON 103
Tutoring in Schools	EDUC 497I ST
Ecosystems, Biodiversity & Global Change	ENVIRSCI 214
The Science of Food	FOODSCI 150
Survey of Food Science	FOODSCI 265
Biology of Food in Human Health	FOODSCI 270
Child Development	HUMANDEV 270
New Venture Creation	MANAGMNT 241
Biology of Cancer and AIDS	MICROBIO 160
Infectious Disease and Defense	MICROBIO 320
Microbial Genetics	MICROBIO 330
Physiology and Diversity	MICROBIO 480
Fish Conservation and Management	NRC 260
Wildlife Conservation	NRC 261
Evolution and Conservation	NRC 390E
Intro. to Psychology as a Biological Science	PSYCH 110
Developmental Psychology	PSYCH 350
Adolescent Psychology	PSYCH 355
Animal Cognition	PSYCH 391 QQ-S
Lab in Animal Learning	PSYCH 420
Introduction to Resource Economics	RESEC 102
Soils with lab	STOCKSCH 105
Equipment Operations	STOCKSCH 201
Pasture Management with lab	STOCKSCH 211
Sustainable Soil & Crop Management	STOCKSCH 350

GRADUATE LEVEL COURSES

Cancer Biology	ANIMLSCI 581
ST: Cancer and Chemo Prevention	ANIMLSCI 697G
ST: Special Topics in Toxicology	ANIMLSCI 697I
ST: Cells, Genes, Development (alt. years)	ANIMLSCI 697J
ST: Advanced Immunology (alt. years)	ANIMLSCI 697K
Animal Biotechnology & Biomedical Seminar	ANIMLSCI 792
Journal Club: Immunology	ANIMLSCI 794A
Journal Club: Cells, Genes & Development	ANIMLSCI 795A
Population Genetics	BIOLOGY 514
Comparative Vertebrate Anatomy	BIOLOGY 521
Histology	BIOLOGY 523
Principles of Evolution	BIOLOGY 528
Herpetology	BIOLOGY 540
Ichthyology	BIOLOGY 542

Ornithology	BIOLOGY 544
Mammalogy	BIOLOGY 548
Animal Behavior	BIOLOGY 550
Cellular & Molecular Biology II	BIOLOGY 559
Human Physiology & Lab (alternate years)	BIOLOGY 564
Comparative Physiology	BIOLOGY 566
Endocrinology	BIOLOGY 568
Developmental Biology	BIOLOGY 580
Advanced Genetics	BIOLOGY 583
Animal Communication	BIOLOGY 597AC
General Biochemistry I	BIOCHEM 523
General Biochemistry II	BIOCHEM 524
Immunology Laboratory	MICROBIO 542
Animal Virology	MICROBIO 570
Parasitology	MICROBIO 590S
Wetlands, Wildlife Ecology and Management	NRC 563
Wildlife Habitat Management	NRC 564
Wildlife Population Dynamic and Management	NRC 565

COURSE SUBSTITUTIONS & WAIVERS

Students must meet the requirements listed for their major and concentration as listed in their Academic Requirements Report (ARR) in order to be cleared for graduation by the Veterinary & Animal Sciences Department. To apply for approval of a course substitution, or in extenuating circumstances, a waiver, students must fill out an application available at http://www.umass.edu/vasci/undergrad/forms/index.html. The student's advisor includes a statement and the application is considered by the departmental Curriculum Committee.

Required Major Course	Accepted Substitution
ANIMLSCI 285	BIOLOGY 285, BIOCHEM 285
ANIMLSCI 220	BIOLOGY 564
ANIMLSCI 311	BIOLOGY 311, BIOCHEM 311
ANIMLSCI 332 – no substitution for Pre-Vet majors	ANIMLSCI 333 – Animal Science majors only
ANIMLSCI 366	MICROBIOLOGY 265, MICROBIOLOGY 312
BIOCHEM 420	BIOCHEM 423
MATH 127 - Pre-Vet majors	MATH 131 - Pre-Vet majors
STATISTC 111	STATISTC 240, RESECON 212

Courses taken at outside universities to meet graduation requirements must be pre-approved. There are two forms for domestic transfer courses: Prior approval for Completing Senior Year in Absentia (for seniors and for any part of the senior year) and Prior Approval for Transfer Course Work, these are available at https://www.umass.edu/registrar/students/transfer-information/transfer-credit. An International Prior Approval form can be obtained from the International Program Office. If the course to be transferred has not previously been approved for all UMass students by the Registrar's Office and is to be used to fulfill major requirements, the transfer course must be pre-approved by the student's advisor on the appropriate form. The student is responsible for supplying the course description, syllabus, and the name of the textbook, so the student's advisor can evaluate whether the course to be transferred is the equivalent of the course required by the major. Prior approval of transfer is important to expedite the successful transfer of courses. A minimum C- grade in the course to be transferred is required.

Information on AP and IB credit is available at:
https://www.umass.edu/admissions/apply/transferring-credit

UMass does not allow students to take most courses multiple times for credits. For example: a student can't transfer in and receive credit for an AP Calculus course and then also receive credit for the same level Calculus course taken at UMass. Students can petition the registrar to remove AP course credits if they decide they want to retake a course at UMass for which they have previously received AP credits.

RESEARCH TUTORIAL, INDEPENDENT STUDY, INTERNSHIP/PRACTICUM AND TEACHING ASSISTANT COURSES

The Department of Veterinary & Animal Sciences encourages students to pursue work outside the conventional lecture or class-associated lab environment and to undertake research projects under the direction of a UMass faculty member or as outside internship experiences. Classes are taken pass/fail or for a letter grade, and range from significant discovery-based research projects ('91C/M courses), independent literature or data review and analysis ('96 courses), or to an internship/practicum experience ('98 courses). NOTE: No more than 18 credits of '98 courses can be applied to the 120 credits required for graduation, and no more than 15 credits of '98 courses can be applied to the 45 credit residence requirement. Electronic format contracts for faculty sponsors and students are available online at https://www.vasci.umass.edu/undergraduate/undergraduate-forms or in print format outside the Undergraduate Program Office, ISB 427X.

BIOTECHNOLOGY RESEARCH EXPERIENCE COURSES ('91C/M courses)

Biotechnology Research Experience courses are letter-graded discovery-based tutorial research experiences with a UMass faculty sponsor that emphasize cellular and molecular approaches (ANIMLSCI 291C, 391C, or 491C) or animal models (ANIMLSCI 291M, 391M, or 491M) in research related to biotechnology. Research projects can be focused on optimization of a research technique, the development of a research tool, or experimental testing of a hypothesis. The course title "Biotech Research- Cell & Molec I, II, or III" or "Biotech Research- Animal Models I, II, or III" will be visible on the transcript to potential employers or graduate/professional schools. Course levels are based on the number of credits taken, with 1 credit averaging 3 hours of work per week over 15 weeks of the fall or spring semester (i.e. 291= 1 credit; 391= 2 credits; 491= 3 credits). Hours may include time spent in lab, in group meetings, or on background reading, and will be agreed upon in advance between the student and the faculty sponsor. Courses can be taken multiple times for credit.

Students wishing to enroll in a biotechnology research experience course should identify a potential faculty sponsor at UMass, preferably by their junior year, and contact that faculty sponsor to inquire whether the faculty sponsor has any available spots in any of their research projects and if so, to discuss the project and expectations. The faculty sponsor and student match the time to be committed by the student to the number of credits to be enrolled in and agree on the reporting requirement of a poster at Science Day in the spring semester or an oral presentation in a group meeting. Faculty sponsors for the '91C/M courses can be from any department at UMass. In addition to the VASCI department, faculty in the Psychology and Brain Sciences, Biology, Biochemistry and Molecular Biology, and Microbiology departments have sponsored students. VASCI faculty members have also sponsored students from majors other than Animal Science or Pre-Veterinary Science. Submit completed contract to mschneider@vasci.umass.edu or ISB 427Z to have the course added to your schedule.

Form of posters or oral presentations for Biotechnology Research Experience classes

1. All reports should contain the following information:
    a. Title and names of student, any collaborators, and faculty sponsors
    b. Abstract of 200-300 words summarizing the project and conclusions (poster)
    c. Introduction- What is known thus far, significance of research question and hypothesis to be tested or goal of project
    d. Materials and Methods
    e. Results- quantitation of data and statistical analysis is encouraged
    f. Conclusions- interpretation of findings and suggestions for further research
    g. References (poster)
2. Presentation of background, hypothesis, and data interpretation are integral to scientific research. Students will be supported in this endeavor by their sponsoring faculty member and faculty member in charge of the '91 courses (e.g. how to use PowerPoint and Photoshop software for posters and oral presentations, how to run statistical analyses). Students are also encouraged to participate in the annual Massachusetts Statewide Undergraduate Research Conference (https://www.honors.umass.edu/undergraduate-research-conference).

INDEPENDENT STUDY COURSES ('96 courses)

ANIMLSCI 496 or ANIMLSCI 596 courses may be taken under the direct supervision of a UMass faculty sponsor and may be used for literature or data review and analysis or other projects that do not fit in the '91 Biotechnology Research course structure. A letter grade and course title "Independent study" is listed on the student's transcript. ANIMLSCI 596 is a graduate-level course; generally this level is used by upper level undergraduate students but can also be used by beginning graduate students. Products to be generated in the '96 courses are determined by the faculty sponsor and agreed to by the student. Examples of appropriate independent study outputs include: papers, posters, oral reports or a portfolio of work. A 1 credit independent study course averages 3 hours of work per week over 15 weeks of the fall or spring semester, or 45 hours total per semester. Credits may vary from 1 to 6, or 3 (1 credit) to 18 (6 credits) hours of work per week. Submit completed contract to ISB 427Z or mschneider@vasci.umass.edu to have course added to your schedule.

INTERNSHIP/PRACTICUM COURSES ('98 courses)

The Veterinary & Animal Sciences Department strongly encourages students to participate in internships in order to achieve the diverse veterinary medical related experience required for a competitive veterinary medical school or graduate school application and to explore alternative career options. The 298, 398, and 498 practicum courses are a mechanism for students to earn credit for these internship experiences. Each course is graded pass/fail and can be taken for 1-18 credits, the total amount of credits applied toward the 120 credits required for graduation is limited to 18 credits. The department maintains a list of local (and state-wide) veterinary clinics, biotech companies, farms, zoos, animal shelters, animal trainers and behaviorists, and wildlife centers where Animal Science and Pre-Veterinary Science students have interned in the past. The College of Natural Sciences maintains a database of completed internships so you can see where other students have already interned: https://secure.cns.umass.edu/webforms/internships? Students interested in working in a Massachusetts life sciences company may pursue the Life Sciences Internship Challenge (http://www.masslifesciences.com/programs/internship/) from the end of their sophomore year to one year after their graduation with a B.S. or M.S. degree. The Life Sciences Internship Challenge is a workforce development program focused on enhancing the talent pipeline for life sciences companies in Massachusetts and offers part-time or full-time paid internships all year long.

Join Handshake (https://umass.joinhandshake.com/), UMass Amherst's comprehensive database of internships and jobs, and where you will learn about all career-related events on campus. There, you can search for internships that interest you.

Students enrolled in a '98 course are covered for liability by the UMass Amherst General Liability (GL) plan. Liability insurance covers any damage a student may cause at an internship site, such as damage to property or to another person at the internship site. It does not cover injury to the student, which is covered by the student's health insurance policy. Some human direct care internships (e.g. nursing or psychology) may require additional Direct Care coverage from their family's homeowners insurance. If an internship sponsor requires evidence of liability insurance coverage, the student enrolled in a '98 course should send the mailing address of the internship sponsor to Mary Lysakowski (mklysako@umass.edu), the director of Internships and Co-ops at UMass Amherst's Central Career Services. The UMass Treasurer's Office will then generate a certificate of liability coverage and send it directly to the internship sponsor.

In order to enroll in a '98 practicum course, students should first identify an internship sponsor and then a faculty sponsor. The student and sponsoring faculty member discuss the project, the appropriate number of credits (1 credit=minimum 45 hours), and the required academic product to be produced, which is usually a journal documenting the hours worked and what was learned, or a paper, poster or powerpoint on a related topic. To register:

1. Go to Handshake: https://umass.joinhandshake.com/ (Contact Mary Lysakowski in Career Services, 510 Goodell, or 413-545-6265 with questions)
2. Fill out internship form with internship sponsor information, number of credits and class number 298, 398, or 498, faculty sponsor, 1-3 learning objectives and academic product component (this is required).

3. Career Services emails the faculty sponsor for contract approval and sends a pdf of the contract to department staff member for manual enrollment.
4. Enjoy your internship!
5. Submit your academic project to your faculty sponsor at the end of the semester, or at the end of the second summer session, in time for the faculty sponsor to assign the final grade.

During the fall and spring semesters, students can register for up to 19 credits and can apply to the CNS academic dean for a credit overload approval based on their GPA. We encourage students to register for at least 1 credit for their internships so that they are covered for liability by the UMass Amherst General Liability (GL) plan.

TEACHING ASSISTANT (296T, 396T, 496T)

Undergraduate TA's are registered as follows:

AnSci 296T 1-2 credits. Repeatable once for credit.

After completing the AnSci 296T level twice, Undergrad TA's are next registered in:

AnSci 396T, 1-2 credits. Repeatable once for credit.

After completing the AnSci 396T level twice, Undergrad TA's are next registered in:

AnSci 496T, 1-2 credits. Repeatable once for credit.

ANIML SCI 296T - Introduction to Teaching in Animal Science

Students gain experience in teaching all aspects of Animal Science courses. Students will be expected to demonstrate specific competencies related to labs and assisting students; and lead review sessions. No contract required. Instructors send list of TA's to Undergraduate Program Office to add this course to student's schedule. For Moodle access, a FERPA form must be completed by the TA and submitted to the instructor.

ANIML SCI 396T - Intermediate Teaching in Animal Science

Students gain further experience in teaching all aspects of Animal Science courses. Students will be expected to demonstrate specific competencies related to labs and assisting students; and lead review sessions. No contract required. Instructors send list of TA's to Undergraduate Program Office to add this course to student's schedule. For Moodle access, a FERPA form must be completed by the TA and submitted to the instructor.

ANIML SCI 496T - Advanced Teaching in Animal Science

Students gain advanced experience in teaching all aspects of Animal Science courses. The learning objectives of AnSci 496T include the clear oral communication of scientific information, the formation of good pedagogical practice, and the design of assessment tools. No contract required. Instructors send list of TA's to Undergraduate Program Office to add this course to student's schedule For Moodle access, a FERPA form must be completed by the TA and submitted to the instructor.

GRADES

The following is a summary regarding the University's grading system. For more detailed information the student should consult the most recent edition of ***Code of Student Conduct*** (https://www.umass.edu/dean_students/codeofconduct) published annually. The University's official grading system is: A (4.0), A- (3.7), B+ (3.3), B (3.0), B- (2.7), C+ (2.3), C (2.0), C- (1.7), D+ (1.3), D (1.0), F (0.0), IF (incomplete failure calculates as an F for students without graduate standing), INC (incomplete calculates as an F for students without graduate standing until final grade is received), P (Pass: No effect on cumulative average but is added to graduation credits). Courses marked F, INC, W, Y, NR, blank or AUD do not earn graduation credit. Courses below the 100-level earn semester credit but not degree credit. These courses are factored into the semester and cumulative grade point average. Students who are unable to complete course requirements within the allotted time because of severe medical or personal problems may request a grade of Incomplete from the Instructor. A grade of Incomplete will be converted to an F, if it is not resolved by the end of the following semester.

REPEATED COURSES

Students may retake an unlimited number of classes to replace the grade, but only once (without permission from the dean) for each class. SPIRE will stop students from registering for a course for the third time. Students can register for a course for a second time, and if their first grade is a "C-" or below, they can replace the first grade with the second grade in their calculated GPA. The grades received in both the original course and the repeated enrollment remain on the student's record. Successful repetition of a course originally graded

F will yield credit toward graduation. If their first grade is a "C" or above, they can register a second time and receive a grade that will appear on their transcript, but with 0 credits. This is called an "illegal repeat" but does not have any sanctions. This grade will be multiplied by 0 credits, and thus the product of 0 will not impact the GPA. Students who need to retake a course for a third time because they have failed a major-required course twice or need a "C" or higher minimum grade to progress will have the opportunity to appeal online to the College of Natural Sciences dean. Permission for a third repeat is rarely granted by the dean and students should then reevaluate their choice of major.

PASS/FAIL GRADING POLICY

The Department of Veterinary & Animal Sciences concurs with the UMass Pass/Fail policy which states that any full-time undergraduate shall be eligible to use the pass/fail option in one course each semester except for courses taken to satisfy the General Education requirements. We emphasize the established purpose of the pass/fail policy is "to encourage full-time students to be usefully venturesome in the choice of their elective courses." The Department of Veterinary & Animal Sciences ***requires that all Departmental major requirements are taken on a graded basis***. Because of the reluctance or refusal of some veterinary school and graduate school admission boards to evaluate transcripts with pass/fail courses, students who anticipate applying for admission to professional or graduate schools are encouraged to take all Departmental courses and all math and science courses on a graded basis.

ACADEMIC STATUS

The Academic Status may be confusing because of the many categories in which a student may be placed. The following is a brief description of the common academic status categories; for more details consult the most recent edition of ***Code of Student Conduct*** (https://www.umass.edu/dean_students/codeofconduct) published annually by the UMass Dean of Students office.

Good Standing – Students are in good academic standing when their cumulative grade point average is 2.00 or above. The number of credits per semester is not used to determine good academic status. However, the Registrar's Office will issue a credit alert to students who have earned less than 12 credits per semester. If 48 degree credits have not been earned by the end of four semesters, the student must obtain approval of an academic plan for graduation.

Academic Warning – Students with a cumulative average of 2.00 or above but whose semester average is less than 2.00 (C grade), will be sent a warning stating that they should consult their academic advisor.

Academic Probation – Students whose cumulative average falls below 2.00 will be placed on Academic Probation. Students who have been placed on Academic Probation or who have received a second consecutive Academic Warning should contact their undergraduate dean.

Academic Suspension – Students who have been on Academic Probation and who fail to achieve or maintain good standing in any subsequent semester will be placed on Academic Suspension unless they meet requirements for a successful appeal of their academic status. Suspension means that the student may not be enrolled in the succeeding semester; it is a one-semester separation from the University.

Probation Continued – Students subject to Academic Suspension or Dismissal, whose semester's work shows substantial improvement, may be placed on Probation continued instead of being suspended or dismissed at the discretion of their undergraduate dean.

CREDIT OVERLOAD PETITION

If you are a full-time student and want to take more than 19 credits, you must request a credit overload. Use the Credit Overload Petition form https://secure.cns.umass.edu/webforms/credit-overload-petition to request an increase in your credit limit. No overloads will be approved for first-semester students - both first year and transfer. If approved for a credit overload, students are not allowed to register for the extra courses via SPIRE until late July for fall semester and late November for spring semester. Credit overloads will not be approved for the current semester for work done previously (fall, winter, spring, summer). For example, if a student does an internship/independent study during the summer, credits must be arranged through University Without Walls (UWW/CPE). It is not possible for work done in the summer to be reflected as credits earned in the fall.

HONORS

The Commonwealth Honors College (CHC) offers a variety of ways for students to graduate with CHC honors. Beginning with the Class of 2014 the CHC developed two tracks that allow students entry into its coursework at different points in their undergraduate careers https://www.umass.edu/honors/curriculum. Students who enter into CHC at the onset of or early in their undergraduate career are eligible to complete both the General Studies Honors track as well as the Advanced Scholarship track, while students who enter later in their careers, when many of their General Studies courses have already been completed, are eligible to complete the Advanced Scholarship portion of the CHC.

Departmental Honors is one way of completing the Advanced Scholarship portion of CHC. Departmental Honors provides opportunities for students to take enriched courses, mainly through colloquia, and to work directly with the faculty and their graduate students in laboratories on research projects.

VASCI faculty members sponsor honors research and thesis options. This offers students an in-depth experience in an area of academic scholarship (i.e. research) and how it is conducted and reported. It is a valuable experience for advanced students who wish to extend their education beyond the classroom.

The CHC is the home of the honors experience on the UMass campus https://www.honors.umass.edu/. Honors students in our major are basically enrolled in two programs, the CHC and the Department of Veterinary & Animal Sciences and meet the requirements of both for graduation. The Veterinary & Animal Sciences Department works closely with the CHC to provide opportunities for personal enrichment through colloquia and research at the undergraduate level. The colloquia provide opportunities for discussion with faculty in small groups. Research is conducted in labs, and other venues, to introduce students to intellectual inquiry through faculty-guided thesis projects.

ADMISSION REQUIREMENTS - DEPARTMENTAL HONORS

1. To participate in Departmental Honors, students must be members in good standing of CHC with the ability to complete 45 graded (not pass/fail) credits in residence (registered at UMass Amherst, not transferred) and maintain an overall 3.4 GPA

2. Students must meet with the Departmental Honors Director to discuss requirements and departmental opportunities. If you are already enrolled in CHC then the Departmental Honors Director will ask for some information and send the change of major request to CHC digitally. If you are not yet enrolled in CHC you will have to apply for departmental honors using the online application form at the CHC website.

Course Requirements for VASCI Department Honors:

1. One ANIMLSCI Honors course any level*
2. One ANIMLSCI Honors course at the 300-level or higher*
3. ANIMLSCI 499Y “Honors Research”
4. ANIMLSCI 499T “Honors Thesis”
5. The minimum grade accepted for any departmental honors course is a “B”.

* *The Veterinary and Animal Science Department will often accept related departments’ honors courses as substitutes for the ANSCI honors courses outlined above or graduate courses.* All substitutions must be vetted by the Departmental Honors Director before being accepted and sometimes require the further approval of the CHC.

PRE-VETERINARY SCIENCE & ANIMAL SCIENCE HONORS PROCEDURES

All Veterinary & Animal Sciences Departmental Honors students must register with and be a member of the Commonwealth Honors College (CHC).

1. Junior year or earlier:

A. Select a faculty honors thesis advisor prior to the junior year. Begin working in the lab and undertake some library research to become familiar with the lab and the field of study. Begin preparation of the thesis proposal and identify (with your thesis advisor) a research project. Some students begin work on a closely related project up to two years

before the start of their thesis while others start during their junior year.

B. Enroll in 499Y in April or May of your Junior year. You must identify a proposal topic, a research chair, selected reading and a date for the completion of your 499T proposal. Information regarding the Individually Contracted Thesis Form Part I/499Y and instructions for the proposal can be downloaded at the CHCwebsite:https://www.umass.edu/honors/curriculum/thesis/individual/499y
The proposal must be submitted through the CHC PATHS online system.

2. Senior year:

A. Enroll in 499T by submitting the honors thesis proposal through CHC PATHS. The due date is typically at the end of the semester prior to when it is to be completed (ie end of November for Spring semester). The contract and instructions for the Part II: 499T Honors Thesis Proposal are found at the CHC website:
https://www.umass.edu/honors/curriculum/thesis/individual/499tp

A full thesis 499T proposal is approximately 15 pages and consists of: a 5-10 page review of the relevant research literature, a discussion of the research project, a description of the methodology and other criteria as listed in the instructions for the proposal. The proposal is first presented to the thesis chair and the selected committee member for discussion prior to submitting online. Once submitted through CHC PATHS, the proposal is routed to the chair, then the co-chair and then to the Departmental Honors Director for further review. Once all permissions have been obtained and the proposal deemed satisfactory by those individuals it is then routed to the Academic Review Panel at CHC where it needs to be reviewed BEFORE the student can be registered. This process may take more time than expected so be sure to submit the proposal for review in a timely manner. You will receive a Y at the end of the 499Y semester, which keeps the course out of the GPA calculation. The grade is awarded at the time of completion of 499T at which time the 499Y grade will also be awarded.

B. Prepare and deliver an oral defense of your thesis to the Veterinary & Animal Sciences Department on Science Day, which is held prior to finals during the reading period in the spring semester. Students are also encouraged to participate in the state sponsored Undergraduate Research Conference held annually at UMass and coordinated by the CHC.

C. Submit the final thesis and forms to the CHC by the graduation deadline using CHC PATHS. The department does not dictate the particular structure of the thesis however an Animal Science thesis usually consists of several sections including: a literature review (background), an introduction to the problem being studied, materials and methods, results, discussion, future studies and references

Other information for Honors Students

Optional IE: Departmental Honors Thesis students have the opportunity to enroll in a 1-credit Integrative Experience - Integrating Learning and Research - ANIML SCI 494TI. The goal of this one credit seminar is to enhance your Integrative Experience course and Departmental Honors Thesis Experience by examining and applying your general education learning. *This course is open only to students who are also enrolled in 499Y/499T and will be accepted as the University/Department Required IE in lieu of the 3 credit ANSCI IE (494GI) offered to all students.*

Honors Fellowships and Grants: All Departmental Honors students are encouraged to apply for a Research Assistant Fellowship which provides the student with a stipend to support research endeavors. Students actively engaged in thesis research are encouraged to apply for Honors Research Grants which provide money for required lab materials. Students are able to apply each semester for these awards. Deadlines and application information are relayed directly to CHC students through the weekly.

VETERINARY SCHOOL ADMISSION

VETERINARY SCHOOL REQUIREMENTS

The courses listed below meet the requirements of most veterinary schools. However, after selection of the school(s) you wish to attend, consult their catalog for specific requirements. Also check with your academic advisor. A chart indicating the requirements for and providing links to 41 Veterinary Colleges can be found on the VASCI website https://www.vasci.umass.edu/undergraduate/pre-veterinary-science-major/pre-vet-advising

VETERINARY SCHOOL REQUIREMENT	UMASS EQUIVALENT
English (1 year)	ENGLWRIT 112 and NATSCI 387
Speech (Kansas, Louisiana, North Carolina, Ohio, Oregon, Purdue Texas A & M only)	COMM 260 or COMM 250 – register during add/drop
Mathematics (1 year)	R1 and MATH 127 or MATH 131
Statistics	STATISTC 111 or STATISTC 240 or RESECON 212
Physics (1 year with labs)	PHYSICS 131 and 132
Chemistry	
General Chemistry with labs (1 year)	CHEM 111 and 112
Organic Chemistry with labs (1 year)	CHEM 261, 262, 269
Biochemistry	BIOCHEM 423/424 + 421 or 420/421
Biology with lab (1 year)	BIOLOGY 151 and 152 and 153
Molecular & Cellular Biology	ANIMLSCI 285 or BIOLOGY 285 or BIOCHEM 285
Genetics	ANIMLSCI 311 or BIOLOGY 311 or BIOCHEM 311
Microbiology	MICROBIO 310
Microbiology Lab	ANIMLSCI 366 2 credits or MICROBIO 265 2 credits or MICROBIO 312 3 credits
Anatomy and Physiology	ANIMLSCI 220 or BIOLOGY 564 or BIOLOGY 565 or BIOLOGY 566
Animal Science	
Animal Nutrition	ANIMLSCI 332
Animal Management Courses (1 year)	ANIMLSCI 101/103, 231/251, 232/252, 233/253, 234/254, 236/256, 297D/297DC, 455/456
Science Electives	ANIMLSCI 390E, 421, 432, 472, 521, 572, 581H BIOLOGY 521, 540, 542, 544, 548, 583

Applying to Veterinary Medical Colleges as a University of Massachusetts student
1) Excellent grades. Aim for a GPA of 3.5 or better. The higher the GPA, the higher number of veterinary medical college acceptances and the more options open to the student. A minimum of a 3.4 UMass Amherst GPA is predictive for admission to at least one US veterinary medical school; the average GPA of admitted veterinary medical school students in 2019 was 3.6. An "A" in a higher level science course (i.e. 400 and above) counts for more than an "A" in a lower level course. Veterinary college admissions look very carefully at your overall GPA and your grades in biology, inorganic and organic chemistry, biochemistry and advanced science courses as an indicator of whether you can pass the demanding veterinary school curriculum. Your grades will largely determine whether you can get into the vet school of your choice or get into any vet school straight out of college, since grades and GRE scores make up 60-70% of the decision. You can take a few classes during the summer session or at a community college, but not so many that it appears that you won't be capable of doing well in the many demanding courses taken at once in vet school (thirteen in the first semester at Tufts). If you have a very low GPA, you can rehabilitate your application portfolio by performing well on higher-level science courses that you take after graduation. Earning a master's or Ph.D. degree also helps.
2) Excellent Graduate Record Exam (GRE) test scores. This test is similar to the SAT, with verbal, quantitative, and written components. Plan on preparing to take the GRE no later than the fall of your junior year by going to the Educational Test Service (http://www.ets.org/gre/), downloading the free Powerprep II software for Windows, working through a test preparation

book or taking a course. You should start taking the GRE by the spring of your junior year, so that you can take them more than once before the vet school application deadlines in September of your senior year. Taking the GRE twice is sufficient; taking the test three or more times looks suspicious. Do not take the test before you have prepared-- a low score will hurt your chances, even if you have a higher score later. A very high GRE could compensate for a lower than average GPA. It takes a high GPA to make up for a low GRE.
3) Veterinary medical related experiences. You need three experiences of at least 200 hours each to be competitive, chosen from the following four areas:
a) Large animal, b) Small animal, c) Wildlife/conservation, d) Laboratory research
Veterinary medical colleges prefer applicants with an open mind about animal species since their mission is to teach you the material that you will be tested on the National Veterinary Licensing exam in your fourth year of veterinary medical school. They are judged on the basis of the percent of their students who pass the licensing exam, so they have a vested interest in your interest in all of the species covered. Thus, it's a mistake to have two or three veterinary medical-related experiences centered on small animals or horses, even if you think that's what you will specialize in as a veterinarian. Conversely, if you are interested in a veterinary specialty (e.g. zoo medicine), make sure that you gain experience in that area. These experiences can be pursued during the school year or during the summer, but keep in mind that it might be easier to find an opening in a vet clinic near home than near Amherst, where you'll be competing with all the other pre-vet students. Summer experiences may also be more exotic (i.e. internship at an aquarium). These experiences are required so that the veterinary colleges are assured that you have a comprehensive grasp of the veterinary medical profession and so that you can cultivate contacts who will write superlative recommendation letters for you. Document your experiences daily (hours worked, what species) so that you can fill in details on your applications years later. Remember that veterinary medicine is just as formal as human medicine. Just as you would defer patient questions to the M.D. if you were working in a human clinic, you should defer all client questions on the diagnosis or treatment of their animals to the D.V.M. It is a good idea to periodically ask your supervisor for feedback on your performance and to implement their suggestions.
4) S*uperlative recommendation letters* (minimum 3). One to two will be from contacts from your veterinary medical related experiences, and one to two will be from an academic advisor or a professor from a science class. At least one to two of the recommendation letters should be from a veterinarian. Once you've identified candidate references, ask them if they feel that they could write you a strong letter of recommendation for vet school. You don't want a lukewarm letter of recommendation and it's no fun to write one, so both of you will benefit from this.
Recommendations consist of two parts. In the first part, the recommender is asked to rate you on your emotional stability, initiative/originality, motivation, personal and social maturity, dependability, communication skills, integrity, intellectual capacity, leadership and ability to work with others. Your goal in your veterinary medical related experiences and in your interactions with your professors is to convince the recommender that you deserve the highest rating in all of these categories. There may be a question about whether you can handle large and/or small animals adequately, but the choices are "yes", "no" or "not able to judge". The veterinary schools are interested in your psychological profile and how you interact with other people, who will be your classmates, professors, and clients. The assumption is that you can interact satisfactorily with animals, or you wouldn't be applying to veterinary medical college. The second part of the recommendation is a letter.
When you ask someone to write a letter of recommendation, send them your resume/CV to make writing a strong letter as easy as possible. List *all* of your work, veterinary medical related and extracurricular activities, with phrases underneath each activity pointing out how this activity proved you have the character traits listed above (e.g. "Cashier at a supermarket for five years--demonstrated dependability and integrity in handling large sums of money"). Your letter writers will use this information in their ratings and their letter. If there's a weakness in your application (i.e. low grade in Chemistry 111 because of a death in the family), discuss it with your letter writers so that they can help you make your best case. You are asking a huge favor of your letter writers. They have agreed to write you a letter because they believe in you. Vet schools will not pay attention to bland letters or to positive letters with no evidence to back up the letter writers' claims.

5) *Personal statement/ essay questions.* Start working on your personal statement early (June after junior year) and have other people read it and make suggestions. Think about it from the perspective of the admissions counselor, who has to read thousands of these personal statements. Don't put the admissions counselor to sleep. Don't make the mistake of using platitudes ("Helping animals is very rewarding"), dwelling on how long you've wanted to be a veterinarian ("…since I was *in utero*."), how much you love animals ("I love my cat/dog/horse/iguana."), or how you were motivated to become a vet because of an emotional response to the death or rescue of an animal. Avoid a reiteration of your veterinary medical related experiences. Instead, demonstrate that you've thought deeply about the profession of veterinary medicine. For example, identify emerging trends and challenges in veterinary medicine, issues in animal welfare, and influential cases you've seen and conversations you've had. Relate these to your goals and the contribution you plan to make to the field of veterinary medicine. Veterinary medical schools are looking for future leaders in the field.
6) *Choice of veterinary medical colleges.* You will have to decide whether you only want to go to one veterinary school (maybe the one in your state of residence), or whether it's more important to you to start veterinary college the fall after you graduate with a B.S. The highest ranked veterinary schools are very selective. Most students apply to a range of schools, from their dream school to their safety schools. Consult with members of the Pre-Veterinary advisory committee on your choices. Your odds of getting into a veterinary school are affected by whether a veterinary school has reserved spots for residents of your state. You may want to establish residency in another state by working there after you graduate (attending school there doesn't count). If you want to go to a specific school, go ahead and apply even if your odds are low.
7) Excellent interview. Prepare for the interview by reading American Veterinary Medical Association discussions on current veterinary medical controversies. Find out about the job opportunities and starting pay for DVMs. The average debt for a graduating DVM is $165,000, so you should have a plan for paying it back. Research the veterinary school so that you're prepared with questions about their program, financial aid, etc. Make sure you know your own application inside and out—it looks very bad if you can't tell your interviewer about your own record and experiences. Read what other interviewees have written at: https://www.studentdoctor.net/schools/schools/8/veterinary-interview- feedback/1

Suggested Timeline

High school and Freshman year
-- Participate in a veterinary medical related experience in a small or large animal practice, with a wildlife conservation organization/zoo/aquarium or in laboratory research.
-- Investigate Veterinary colleges and career choices on the AAVMC website and the Journal of the American Veterinary Medical Association.

Sophomore year
-- Participate in a different veterinary medical related experience in small or large animal practice, with a wildlife conservation organization/zoo/aquarium or in laboratory research.
-- Investigate Veterinary college programs. Make sure you will have all necessary prerequisite classes for the veterinary colleges you are considering applying to.
-- *January:* Decide whether you will apply to the early admissions program at Tufts University Cummings School of Veterinary Medicine. Work on the application during the January break. Ask evaluators if they would be willing to write a supportive evaluation and letter for you, as described below for a senior.
-- *March:* Early admissions deadline for Tufts University Cummings School of Veterinary Medicine. If you are not accepted, schedule an appointment with an admissions counselor from March-August to review your application with you.

Junior year
-- Participate in a different veterinary medical related experience in small or large animal practice, with a wildlife conservation organization/zoo/aquarium or in laboratory research.
-- Decide which Veterinary colleges to apply to.
-- *Fall:* Start preparation for the Graduate Record Exam (GRE)
-- *Winter:* look at the VMCAS site and start to familiarize yourself with it. This will be useful to start gathering all the details the application requires.
-- *Spring to summer:* Take the GRE one to two times. Check allowable frequency of test taking on GRE website-- minimum spacing could be no more frequent than once every 30

days. Check the individual vet schools' GRE deadline requirements on the VMCAS website to make sure that you will start taking the GRE early enough. When you take the GRE, arrange for your scores to be sent directly to the vet schools to which you are applying.
-- *January – May:* VMCAS site opens. Start working on your application now! Filling out the information will take a considerable amount of time. Write the first draft of your personal statement and other essays. Plan to show these to multiple people for suggestions and edits and expect to prepare at least six drafts. Request official transcripts from all universities that you have attended and request that transcripts be sent to VMCAS. Prepare and send supplemental applications to veterinary colleges that require them. Two US schools (Texas A&M and the University of Missouri for residents) use their own application process, if you apply to one of these schools, ask your evaluators to submit their evaluations and letters through Texas A & M and University of Missouri websites in addition to the VMCAS.
-- *May-July:* Contact your evaluators to ask them to write a strong letter of recommendation for you. Supply them with an unofficial transcript and a resume that makes all the points you want to appear in the evaluation letter. You can register up to six evaluators on VMCAS; a minimum of three evaluators is required. Follow up with your evaluators as to whether they have received an email from VMCAS or schools with their own applications giving them access to the evaluation website. Let them know the deadline-- VMCAS won't mail your application without three evaluations.

Senior year
-- *Augus*t-*September*: VMCAS applications are due September 15. Try to finish and submit your VMCAS application by the end of August to avoid last-minute issues. Remind your evaluators of the deadline by sending them an email thanking them for completing the evaluation and letter by that date.
--*December-Spring:* Prepare for interviews. If you are not successful this round, make an appointment to talk to a veterinary medical school admissions counselor in a school to which you have applied about the weaknesses in your application and consider what you should do to remedy them, whether you should change which veterinary medical colleges you apply to in the following fall, or whether you should implement "Plan B" and pursue a different career path. Many people who do not gain admittance immediately after college will eventually do so.
Resources
- Veterinary Medical School Admissions Requirements, published yearly by Purdue University Press http://www.thepress.purdue.edu/titles/vmsar-2020-2021-veterinary-medical-school-admissionrequirements-2020-edition-2021-matriculat
- Journal of the American Veterinary Medical Association http://avmajournals.avma.org/loi/javma
- AAVMC Careers in veterinary medicine, vet school requirements, VMCAS link, scholarships and financial aid for veterinary students http://www.aavmc.org/Students-Applicants-and-Advisors.aspx
- VMCAS portal for application - https://www.aavmc.org/students-applicants-and-advisors/veterinary-medical-college-applicationservice.aspx
- Graduate Record Examination (GRE) http://www.ets.org/gre/

Veterinary School Advisory Committee

Members of this committee advise students on how to gain pre-veterinary medical related experiences and recommendation letters, how to fulfill prerequisites for veterinary school admission, how to assemble their portfolio for veterinary school admission, how to choose which schools to apply to, how to write a successful essay, and how to interview. Committee members maintain contacts with admissions officers at veterinary medical schools, promote ties between UMass Amherst and veterinary medical schools and host speakers from veterinary medical schools. Students are encouraged to speak to any pre-veterinary school admissions advisory committee member about the assembly of their veterinary school application as early as possible in their academic career.
Chairperson - Dr. Janice Telfer, Ph.D. Director UMass Amherst Pre-Vet advising
Dr. Rafael Fissore, DVM, PhD; Dr. Carlos Gradil DVM, MS, PhD; Dr. Katherine Beltaire, DVM; Dr. Amy Rubin, DVM

UMass/Tufts DVM Early Acceptance

The Tufts University Cummings School of Veterinary Medicine located in Grafton, Massachusetts offers undergraduates enrolled at the University of Massachusetts at Amherst the opportunity to apply to the DVM program in March of their sophomore year. A limited number of students are admitted, and upon acceptance, are guaranteed a space in a Tufts University Cummings School of Veterinary Medicine class after they graduate, if they maintain a minimum 3.4 GPA and take the required prerequisite classes. To be eligible to apply, candidates for this program must be sophomores and must have completed a full year each of introductory biology and chemistry. SAT and/or ACT scores will be evaluated in the place of GRE scores. Freshmen contemplating application to the Early Acceptance Program are encouraged to speak with a pre-veterinary advisor about accruing veterinary medical related experiences. If the applicant is not accepted, the applicant can make an appointment with a Tufts admission counselor in the summer to review his/her application, in order to strengthen it for the next round of veterinary medical school applications. Further information regarding this program can be viewed at the Tufts website http://vet.tufts.edu/admissions/dvm-admissions/bachelordvm-program/

Articulated BS-DVM program at UMass Amherst and the University of Melbourne

Students at the University of Massachusetts Amherst can complete an accelerated Doctor of Veterinary Medicine (DVM) program at the University of Melbourne in Australia by simultaneously completing their final spring semester at UMass Amherst and starting their first semester of the DVM program at the University of Melbourne. This is made possible by the fact that Australian universities start their academic year in February, rather than in September. The program is accelerated because University of Melbourne DVM students starting the BS-DVM articulated program in February, instead of 6 months later in September in vet schools in the northern hemisphere, will graduate 6 months earlier than their northern hemisphere vet school counterparts. Cost is reduced because the first semester is charged at UMass Amherst rates, rather than the higher veterinary medical school rates. Final costs are dependent on US dollar exchange rates.

Besides the advantage of graduating 6 months early, the University of Melbourne veterinary medical school has a strong international reputation and is accredited worldwide, so that students can take the North American Veterinary Licensing Exam, which is required to practice in the US. Students are also eligible to take the qualifying exams for practice in Europe, Australia and Asia. Melbourne is located on the southern coast of Australia, has a temperate climate and has been recognized as the most livable city in the world. The unique fauna of Australia, along with domesticated animals, are also readily available for study.

The application procedure for the articulated BS-DVM program has the advantage of being much more informal than the application process through VMCAS. GREs and usual vet school prerequisites such as a full year of Physics are waived. A minimum 3.2 GPA is required. Students simply email with their unofficial transcript to Professor Jean-Pierre “JP” Scheerlinck (j.scheerlinck@unimelb.edu.au) in November- early December for a rapid decision. If the student decides to accept the offer of admission, they should immediately contact Professor Janice Telfer (telfer@vasci.umass.edu), who coordinates the UMass course transfer and bachelor’s graduation clearance process.

For more information:

- Professor Janice Telfer, UMass Amherst (telfer@vasci.umass.edu)
- Professor Jean-Pierre Scheerlinck, University of Melbourne j.scheerlinck@unimelb.edu.au
- http://fvas.unimelb.edu.au/study/courses/doctor-of-veterinary-medicine/overview

University of Edinburgh School of Veterinary Medicine

The Royal (Dick) School of Veterinary Studies at the University of Edinburgh is the United Kingdom’s top-rated veterinary medical school. There are 3 guaranteed spaces for UMass Amherst BS-Pre-Vet students, with a minimum 3.4 GPA. Students can apply at the beginning of their junior year, with an option to study abroad there as an undergraduate, or after the end of their junior year via VMCAS.

DESCRIPTION OF COURSES

DESIGNATIONS: _96 = Independent study; _97 = Special topic; _98 = Practicum; _90 = Experimental, ISB = Integrated Sciences Building

ANIMLSCI 101 – Introduction to Animal Science (Fall) 4 credits with lab, lab fee
Students will learn about the various aspects of animal science including comparative anatomy and physiology, nutrition, genetics, reproduction, research, production, and economics. Emphasis will be placed on the best evidence-based practices in regard to the maintenance, health, and welfare of companion, farm, exotic and laboratory animals.

ANIMLSCI 103 – Introduction to Animal Management (Spring) 4 credits with lab, lab fee
In depth presentation of animal agriculture and its economic implications. Concepts of nutrition, reproduction, husbandry and marketing will be presented for beef and dairy cattle, sheep, swine, poultry and horses. Lab emphasizes application of selected management practices for these animal species. Prereq: ANIMLSCI 101 with a grade of C or better.

ANIMLSCI 191-1 ANSCI1 & - ANIMLSCI 191-2 ANSCI1 Animal Science Majors RAP - Residential Academic Program (Fall) 1 credit - provides a unique opportunity for first-year students who have been accepted into the Animal Science program to connect with other motivated Animal Science majors, meet faculty, and learn about opportunities within the Veterinary and Animal Sciences Dept. Students enrolled in this RAP will live together in Knowlton Hall in the Northeast residential area and will take a 1-credit seminar course in the fall semester of their first year designed to enhance their academic experience and promote a successful transition into the University.

ANIMLSCI 220 - Anatomy & Physiology of Domestic Animals (Fall) 4 credits with lab, lab fee. Integration of gross structural and organ anatomy to physiological systems, function and regulation. Emphasis on relationship of structure to function and system control in both animals and humans. Prereq: BIOLOGY 151 or 161H with a grade of C or better.

ANIMLSCI 231 & ANIMLSCI 251 – Dorset Sheep Management I & II (231 Fall, 251 Spring, 2 credits) Students will perform management activities that are required for the care of the UMass flock. Students will learn skills including: hoof trimming, vaccinating, parasite detection, pregnancy detection, lambing and neonatal care; make decisions regarding selection, breeding and culling, and learn to recognize signs of illness and administer treatments. Work with sheep poses health risks, including development of allergic reactions, physical injury, and exposure to zoonotic diseases. To mitigate these risks, compliance with University and Farm Biosecurity Protocols is required as well as appropriate attire including coveralls, disinfected boots and gloves.

ANIMLSCI 232 & ANIMLSCI 252 - Belted Galloway Management I & II (232 Fall, 252 Spring, 2 credits) Students will learn about the beef cattle production cycle and participate actively in all aspects of herd management, including handling, vaccinating, deworming, breeding, calving, halter breaking, weaning, feeding, fitting, showing, marketing, and maintaining the health and welfare of the herd. Students will also have the opportunity to visit local beef farms and attend livestock shows. This course provides exposure to the beef cattle production cycle and hands-on experience in all aspects of herd management. An emphasis is placed on understanding normal cattle behavior and practicing "sound stockmanship." Work with cattle poses health risks, including development of allergic reactions, physical injury, and exposure to zoonotic diseases. To mitigate these risks, compliance with University and Farm Biosecurity Protocols is required as well as appropriate attire including gloves, coveralls, and washable rubber boots or steel-toe boots.

ANIMLSCI 233 & ANIMLSCI 253 - Boer Goat Management I & II (233 Fall, 253 Spring, 2 credits) Boer Goat Management is an experiential learning opportunity. Students enrolled in this course develop practical skills pertaining to the daily management and welfare of the student-run UMass Boer Goat herd, including handling, feeding, vaccinating, breeding and assisting the herd veterinarian. In the Spring semester (ANILSCI253), students will have the opportunity to assist with the delivery of goat kids and will be responsible for charting their weekly growth for the remainder of the semester. Work with goats poses health risks, including development of allergic reactions, physical injury, and exposure to zoonotic diseases. To mitigate these risks, compliance with University and Farm Biosecurity Protocols is required as well as appropriate attire including coveralls, disinfected boots and gloves.

ANIMLSCI 234 & ANIMLSCI 254 - Poultry Management I & II (234 Fall, 254 Spring, 2 credits) Students will perform management activities that are required for the care of a group of poultry. Day old chicks will arrive soon after the semester begins and students will be responsible for all daily care including: feeding, cleaning, weekly weights, moving the coops on pasture, bird identification, record keeping, marketing and distributing the processed birds. Work with poultry poses health risks, including development of allergic reactions, physical injury, and exposure to zoonotic diseases. To mitigate these risks, compliance with University and Farm Biosecurity Protocols is required as well as appropriate attire including coveralls, disinfected boots and gloves.

ANIMLSCI 236 & ANIMLSCI 256 - Equine Management I & II (236 Fall, 256 Spring, 2 credits) This course provides practical hands-on experience managing the university reproduction horse herd. Scientifically-based principles of equine management will be covered, including safe horse handling and restraint, nutrition application, stable management, pasture utilization, vaccination and deworming protocols. Work with horses poses health risks, including development of allergic reactions, physical injury, and exposure to zoonotic diseases. To mitigate these risks, all students must be trained in university safe horse handling protocols, comply with University and Farm Biosecurity practices, and wear appropriate attire including disinfected boots and gloves.

ANIMLSCI 251 – Dorset Sheep Management II (Spring) 2 credits - See ANIML SCI 231 for description. Students are encouraged to enroll in ANIMLSCI 297L ST – Bay State Livestock Classic.

ANIMLSCI 252 - Belted Galloway Management II (Spring) 2 credits - See ANIML SCI 232 for description. Students are encouraged to enroll in ANIMLSCI 297L ST – Bay State Livestock Classic.

ANIMLSCI 253 - Boer Goat Management II **(Spring) 2 credits** - See ANIML SCI 233 for description. Students are encouraged to enroll in ANIMLSCI 297L ST – Bay State Livestock Classic.

ANIMLSCI 254 - Poultry Management II **(Spring) 2 credits** - See ANIML SCI 234 for description. Students are encouraged to enroll in ANIMLSCI 297L ST – Bay State Livestock Classic.

ANIMLSCI 256 - Equine Management II (Spring) 2 credits) This course provides additional experience managing the university horse herd, including an introduction to all life stages of horses from foals to breeding stallions. Scientifically-based principles of equine management will be covered, including safety of horse and handler, advanced nutrition and health management of equine life stages, equine business applications, and preventive medicine. Prereq: ANIMLSCI 236
Students are encouraged to enroll in ANIMLSCI 297L ST – Bay State Livestock Classic**.**

ANIMLSCI H260 - Animal Care & Welfare with Honors Colloquium (Fall) 1 credit
Students will examine and discuss current research methods, procedures, and experimental design through a series of weekly seminar-based presentations. Each student will be required to lead one weekly discussion with a partner. As the discussion leader, students will be expected to select an animal welfare or animal behavior-related paper from a recent (within 5 years) peer-reviewed research publication to present to the class. The student presenters and the instructor will explore the rationale for specific experimental methods and statistical models used in each paper. In addition, key points of interest and/or controversy about the topic will be discussed. When a student is not leading the discussion, he/she will be expected to actively participate by offering his or her own comments, critiques, and questions. Previous or concurrent enrollment in ANIMLSCI 260.

ANIMLSCI 260 – Animal Care and Welfare (Fall) 4 credits with discussion.
Students will be introduced to the moral and ethical theories of animal rights and welfare and will explore the history of animal welfare and assessment of the animal rights and welfare movement today. Special attention is given to the economic, ethical, and welfare aspects of current animal husbandry practices. SI: Science Interdisciplinary Gen Ed.

ANIMLSCI 285 – Cellular & Molecular Biology (Spring) 3 credits This course is evenly divided between molecular and cellular aspects of biology and is designed to prepare

sophomores for upper level science courses such as genetics, biochemistry, immunology, and the physiology of reproduction. Topics covered include: DNA packaging and X-inactivation, enzymes and DNA replication, polymerase chain reaction and forensics, protein structure, cellular structure and signaling, extracellular matrix, and cell division and death. Problem sets will be based on analysis of primary journal articles. Prereq: BIOLOGY 151 or BIOLOGY 161H AND BIOLOGY 152 or BIOLOGY 162H with a grade of C or better AND CHEM 111 or CHEM 121 or CHEM 121H AND CHEM 112 or CHEM 122 or CHEM 122H with a grade of C or better.

ANIMLSCI 291C – Biotechnology Research Experience I 1 credit (Fall, Spring)
This course is a 1 credit discovery-based research tutorial experience emphasizing cellular and molecular approaches. Students will be responsible for submitting an abstract to their faculty sponsor detailing their work on Science Day at the end of the spring semester. Students should meet with their potential faculty sponsor to discuss whether there are open positions, projects available, and how many hours of work in the lab or facility and outside are expected. Submit completed contract to mschneider@vasci.umass.edu or 427Z ISB to have course added to your schedule.

ANIMLSCI 291M – Biotechnology Research Experience I (Fall, Spring) 1 credit
This course is a 1 credit discovery-based research tutorial experience emphasizing animal models. Students will be responsible for submitting an abstract to their faculty sponsor detailing their work on Science Day at the end of the spring semester. Students should meet with their potential faculty sponsor to discuss whether there are open positions, projects available, and how many hours of work in the lab or facility and outside are expected. Submit completed contract to mschneider@vasci.umass.edu or 427Z ISB to have course added to your schedule.

ANIML SCI 296T - Introduction to Teaching Animal Science (Fall) (Spring) All faculty, 1-2 credits Students gain experience in teaching all aspects of Animal Science courses. Students must have successfully completed the course and related pre-requisites for the course they plan to TA in. Students must submit an application and will be expected to demonstrate specific competencies related to labs and assisting students; and lead review sessions. For Moodle access, students must complete FERPA certification on SPIRE in Student Home > TA FERPA Agreement prior to requesting enrollment from instructor. Instructors send list of TA's to Undergraduate Program Office to add course to student's schedule. Repeatable once for credit.

ANIMLSCI 297B ST – Artificial Insemination Certification (Spring break) 1 credit
This course is conducted during spring break of each year to introduce students to the concepts and procedures involved in the artificial insemination of dairy and beef cattle. The instructor will accompany students to Pennsylvania where they will receive instruction from a professional in the artificial insemination industry. Student participants earn a certificate of completion. Capacity is limited, there is an additional fee. Instructor Consent required.

ANIMLSCI 297D ST (Spring) & ANIML SCI 297DC ST (Fall) – Dairy Calf Management I & II 2 credits This is a two credit experiential learning class that involves the daily care, feeding, and management of pre- and post-weaned dairy calves. Students are expected to attend weekly management meetings and to complete a two week feeding block. This course requires close quarter work with dairy calves. Under the best of circumstances (use of appropriate personal protective equipment) there is a small but significant risk of contracting zoonotic diseases. To mitigate this risk student purchase and use of coveralls and water proof boots is required. Additional PPE (personal protective equipment) will be provided. Students must be committed and understand the responsibilities of this course. Students must have some dairy experience and transportation or access to transportation and must also complete UMass EH&S training within 2 weeks of class start date.

ANIMLSCI 297L ST – Bay State Livestock Classic (Spring) 1 credit
The grooming and showing of cattle, sheep, goats and horses are taught through hands-on experience and presentation of the animals in a show organized by the students each spring. The show is open to the public and is held at the Hadley Farm. No previous experience needed. Class meets one evening every other week. Students arrange mutually convenient times to meet with coaches to learn grooming and showing techniques. Additional requirements may apply.

ANIMLSCI 297P ST – Bay State Livestock Classic Coaching & Management (Spring) 2 credits Department Consent required. This course may not be repeated for credit.

ANIMLSCI 298 - Practicum (Fall) (Spring) All faculty, by arrangement. 1-3 credits/semester Join Handshake - https://umass.joinhandshake.com/, complete contract with faculty advisor. Submit completed contract to mschneider@vasci.umass.edu or 427Z ISB to have course added to your schedule.

ANIMLSCI 301 – Equine Behavior and Learning Theory (Fall) 3 credits lab fee
This course provides an understanding of the behavioral mechanisms involved with human and horse interaction and a model of training based on equine behavior, ecology and learning theory. The welfare consequences of training and competing with horses involved in different disciplines are discussed. This course will help you to better understand how the study of equine behavior theory informs successful behavioral modification or training. Prereq: ANIMLSCI 236

ANIMLSCI 302 – Development and Training of the Horse (Spring) 3 credits
This course will build on information learned in Equine Behavior and Learning Theory. Students will develop evidence-based methodologies for training the horse in-hand and under saddle. Focus on the cognitive and physical development of the horse through all life stages from foal to adult. Prereq: ANIMLSCI 301

ANIMLSCI 311 - Animal Genetics (Fall) 3 credits
This course covers Mendelian and non-Mendelian genetics, molecular genetics, genetic mapping, developmental and population genetics with an emphasis on genetics in animal models. Prereqs: BIOLOGY 151 or 161H with a grade of C or better AND BIOLOGY 152 or 162H with a grade of C or better.

ANIMLSCI 320 - Animal Business Management (Spring) 3 credits
Students will develop an understanding of and proficiency in applying the various economic principles and business management analysis concepts which aid an owner/operator in the decisions involved in the organization and operation of an animal-related firm for continuous profit and production efficiency. Open to juniors and seniors only.
Prereq: ANIMLSCI 103 or instructor permission. Open to ANSCI/PREVET majors only.

ANIMLSCI 332 - Basic Animal Nutrition and Feeding (Spring) 4 credits with lab; lab fee
A detailed study of macro and micronutrients, their digestion, absorption, and metabolism by various domesticated animal species for maintenance and production. Introduction to feeding programs. Prereq: ANIMLSCI 220 or by permission of the instructor.

ANIMLSCI H332 – Basic Animal Nutrition and Feeding with Honors Colloquium (Fall) 1 credit The honors colloquium builds upon the concepts of nutrient digestion, absorption, and metabolism taught in ANIMLSCI 332. This class is taught as a seminar course. Each student is expected to select a paper from a recent (within 5 years) peer-reviewed research publication for presentation to the class. The selected paper must have some direct connection to the subject of nutrition. The rationale for specific experimental methods and statistical models used in each paper are explored by the instructor. Prereq: ANIMLSCI 220 or by permission of the instructor AND Previous or concurrent enrollment in ANIMLSCI 332.

ANIMLSCI 333 – Equine, Cattle and Companion Animal Nutrition (Fall) 4 credits with lab; lab fee. This course focuses on the principles of nutrition and the development of rations. Emphasis on the nutrient requirements and nutrient contents of feeds. P Prerequisite: ANIMLSCI 220. Note: This course may be substituted for ANIMLSCI 332 for Animal Science majors; Pre-Vet majors are required to take ANIMLSCI 332.

ANIMLSCI 365 – Fundamentals in Veterinary and Biomedical Laboratory Techniques (Fall) 3 credits lab; lab fee. Introductory course prepares students for further lab related work. Topics include: lab measurements, solution preparation, instrumentation, practical laboratory exercises. Clinical topics include: human and animal hematology, clinical chemistry, diagnostic biology, parasitology and molecular diagnostics with lab exercises that are applicable to veterinary or biomedical clinical laboratories. Prereqs: BIOLOGY 151 or BIOLOGY 161H AND CHEM 111 or CHEM 121H with a grade of C or better.

ANIMLSCI 366 - Veterinary Microbiology Lab (Fall, Spring) 2 credits, lab fee
A team-oriented microbiology laboratory course for skill development and discovery, focusing on the importance of microbes in animal health and disease; laboratory exercises designed to encourage students to develop and test hypotheses and to think critically about their observations. Prereqs: BIOLOGY 152 with a C or better and BIOLOGY 153 with a C or better. Note: Must have completed MICROBIO 310 (or the equivalent) or be concurrent enrollment. Open to ANSCI/PREVET majors only.

ANIMLSCI 373 – Equine Diseases & Health Management (Fall) 3 credits
Topics: Common diseases in horses; Common pharmaceuticals administered by your veterinarian; Vaccinations; Internal parasites and their control; Lameness (videos); Selected orthopedic problems; Spinal anatomy and disorders; Carpal and metacarpal disorders; Shoulder disorders; Disorders of the fetlock and pastern; Disorders of the forefoot; Disorders of the hind limb; Oral cavity; Digestive cavity; Anatomy of the gastrointestinal track (video); Equine colic; Choke; Feeding special need horse; Caring for the older horse; Newborn Foal; Foal disorders. Note: Possible hands on and demonstration opportunities at the barns: General handling; Physical examination; Record keeping; Coggins testing; Vaccination - Injection sites; Deworming; Ongoing clinical cases at the barn; Dental care; Castration; Lameness; Hoof care and shoeing; Lyme snap test; Acupuncture. Prereq: ANIMLSCI 220

ANIMLSCI 386 - Veterinary Oncology (Fall, Spring) 2 credits lab fee
This laboratory course is an introduction to both canine mammary cancer and mammalian cell culture techniques in the context of conducting basic research with primary canine tumors and an established canine mammary cell line. Topics include etiology of canine mammary cancers, molecular characterization of canine mammary tumors, development of patient-derived xenografts, and canine mammary cancer as a model for human breast cancer. Prereq: ANIMLSCI 103 or ANIMLSCI 115, and BIOLOGY 151

NATSCI 387 – CNS Junior Writing Course (Fall, Spring) 3 credits
Multidisciplinary professional writing course. Research, analyze, reference and write in the formal and informal text conventions used by Environmental Sciences, Natural Resources Conservation, & Veterinary and Animal Sciences. This course must be taken at UMass (credits from other institutions will not be accepted). This course is open to Seniors and Juniors only. Prereq: ENGLWRIT 112/112H or 113/113H or ENGLISH 120 or have already met the CW Gen Ed requirement.

ANIMLSCI 391C – Biotechnology Research Experience II – Cellular & Molecular (Fall, Spring) 2 credits This course is a 2 credit discovery-based research tutorial experience emphasizing cellular and molecular approaches. See page 22 for departmental requirements for presenting your results. Students should meet with their potential faculty sponsor to discuss whether there are open positions, projects available, and how many hours of work in the lab or facility and outside are expected. Submit completed contract to mschneider@vasci.umass.edu or 427Z ISB to have course added to your schedule.

ANIMLSCI 391M – Biotechnology Research Experience II – Animal Models (Fall, Spring) 2 credits This course is a 2 credit discovery-based research tutorial experience emphasizing animal models. See page 22 for departmental requirements for presenting your results. Students should meet with their potential faculty sponsor to discuss whether there are open positions, projects available, and how many hours of work in the lab or facility and outside are expected. Submit completed contract to mschneider@vasci.umass.edu or 427Z ISB to have course added to your schedule.

ANIMLSCI 392A – Careers in Animal Science (Spring) 1 credit
The seminar series will feature presentations by agricultural and animal science professionals in the fields of Animal Health, Animal Nutrition, Genetics, Biotechnology and others. Topics will include resume preparation, interview skills, internship opportunities and web-based employment search guides.

ANIMLSCI 396T - Intermediate Teaching in Animal Science (Fall) (Spring), All faculty, 1-2 credits Students gain experience in teaching all aspects of Animal Science courses. Students must have successfully completed the course and related pre-requisites for the course they plan to TA in. Students must submit an application and will be expected to demonstrate specific competencies related to labs and assisting students; and lead review

sessions. For Moodle access, students must complete FERPA certification on SPIRE in Student Home > TA FERPA Agreement prior to requesting enrollment from instructor. Instructors send list of TA's to Undergraduate Program Office to add course to student's schedule. Prereq: 4 credits of ANIMLSCI 296T. Repeatable once for credit.

ANIMLSCI 397E – Special Topics – Veterinary Medical Terminology (Fall) 1 credit This course is designed to meet the 1 credit Medical Terminology requirement of some veterinary medical schools.

ANIMLSCI 397M – Special Topics – Wildlife Conservation & Veterinary Medicine in Belize (Spring) 2 credits – This is a travel course to Belize, offered in collaboration with the Center for Engaged Learning Abroad (CELA) in Belize. It is intended to provide an introduction to selected wildlife conservation projects in Belize and the role of veterinary professionals in these efforts. The course also provides exposure to the practice of veterinary medicine in Belize as it related to pet and farm and animal species. Additionally, the course will expose the student to cultural and historical aspects of Belize.

ANIMLSCI 397N – Special Topics – Exotic Animal Medicine (Spring) 3 credits – This course is designed to focus on the most common exotic animals kept as pets. Anatomical and physiological differences between exotic animal pets and other domestic animals will be discussed. Principles of husbandry, handling and clinical techniques will be covered. Review of common diseases and the types of treatment of those common diseases will be covered. Laws governing the ownership of exotic animal pets will be discussed.

ANIMLSCI 398 - Practicum (Fall) (Spring) All faculty, by arrangement, 1-3 credits/semester. Join Handshake - https://umass.joinhandshake.com/, complete contract with faculty advisor. Submit completed contract tomschneider@vasci.umass.edu or 427Z ISB to have course added to your schedule. Can be repeated for credit up to 15 credits total for career.

ANIMLSCI 398D – Service Dog Training (Fall) (Spring) 3 credits Course instructor, Dr. Telfer will coordinate enrollment of approved fosterers. Applications to enroll/foster/train a service dog must be made to Sarah Meikle, Director, Diggity Dogs Service Dogs (Email: sarah@indogswetrust.org; Website: indogswetrust.org/foster/).This class is designed to provide students with an understanding of canine communication, health, handling and development and hands-on experience in training psychiatric, medical assist/alert, and mobility assistance service dogs. Diggity Dogs contracts with a breeder who provides dogs to be trained; when you enroll you will be assigned a dog. This course requires a serious commitment of time and effort. Weekly training logs and classes, monthly progress reports, weekly two-hour classroom training and monthly individual classroom assessments at the training facility at 346 Conway Street, Greenfield, MA are required. Students must provide their own transportation. Fostering requires that the dog lives with you, you are responsible for feeding, training and care. Your dog accompanies you to most, but not necessarily all, of the places you go. Diggity Dogs will work with you to provide respite care as necessary (i.e. exam periods). Because these dogs are service dogs in training, they can legally live in the dorms and go places that other dogs are banned from going.

ANIMLSCI 398S - Equine Enterprise I (Fall) 3 credits Management and operation of the Equine boarding facility at the UMass Hadley Farm. Development of Standard Operating Procedures, cash flow statements, purchasing and ordering of supplies, delegation and supervision of labor, and appropriate client communication. Required weekly meetings and student committee assignments. Lab time includes weekly shifts at the facility.

ANIMLSCI 401 - Management of the Equine Athlete (Fall) 3 credits lab fee
Focus will be on the care and management of the equine athlete. Conditioning and prevention of injury, common areas of breakdown within different sports, diagnosis of injury/lameness, as well as different modalities currently available for treatment and rehabilitation. Prereq: ANIMLSCI 220 and ANIMLSCI 236

ANIMLSCI 402 - Equine Rehabilitation (Spring) 3 credits lab fee
The purpose of this course is to provide students with a fundamental understanding of the biomechanics of the horse from a rehabilitator's perspective. Students will be introduced to the core concepts of physiotherapy including integrated therapies and modalities currently used in equine physical therapy and rehabilitation. Students will actively engage with real

equine patients at the UMass Rehabilitation Clinic at the UMass Hadley Farm. Students will be prepared to enter into any rehabilitation program to become a certified equine rehab specialist. Prereq**:** ANIMLSCI 401

ANIMLSCI 421 - Wildlife Reproduction (Spring) 3 credits This course explores comparative reproductive biology in terrestrial and marine wildlife and domesticated animals. It will encompass lectures, open discussion, and problem-based learning built on cases and experiences acquired in the field, literature, lecture topics and discussions. Topics will include: i) Functional Anatomy ii) Embryology iii) Reproductive Endocrinology and Life cycles iv) Reproductive Technologies v) Chemical and Physical Restraint of Animals vi) Problems and Policy Associated with Endangered Species vii) Management of Wildlife in National Parks, Game Ranches and Zoos viii) Contraception ix) Conservation techniques to solve problems of environmental change and international development; human-wildlife conflict x) Careers and Training/Job opportunities. Prereq: ANIMLSCI 220 or equivalent or instructor consent.

ANIMLSCI 432 – Advanced Animal Nutrition 3 credits
The nutrition of domesticated animals with emphasis on dietary programs for production and health. Focus on monogastric, ruminant, and cecal digesting species in lecture. Both hand and computer ration balancing techniques used. Prereq: ANIMLSCI 332.

ANIMLSCI 445A - Equine Reproduction Lab (Spring Semester) 1 credit Equine Reproduction will provide understanding and hands-on opportunity in equine reproduction. Specifically, semen collection, evaluation and processing practice; discussion in mare breeding management and use of hormones; preparation of the mare for breeding; modulation of the estrous cycle; contraception; introduction to embryo transfer. Additionally, the mares in the breeding program at the UMass will be worked-on during laboratories and students will be able to participate in teasing and decision-making on breeding management and assisting in foaling. Client based cases may also be introduced during lab sessions. Prereq: ANIMLSCI 220

ANIMLSCI 454 – Dairy Herd Management (Spring Semester odd numbered years) 4 credits with lab. Managerial problems and practices associated with successful dairying in the Northeast and the U.S. Includes dairy cattle nutrition, selection, breeding, lactation, and waste management. Students expected to participate in lectures. Prereq: ANIMLSCI 332

ANIMLSCI 455 - Research Animal Management I (Fall) 4 credits with lab, lab fee
Humane care, handling, management of mice, rats, gerbils, hamsters, guinea pigs, rabbits, cats, dogs and non-human primates used in research, nutrition, breeding, disease control, gnotobiology, anesthesiology, surgery and necropsy. Open to Junior/Senior ANSCI/PREVET majors only.

ANIMLSCI 456 - Research Animal Management II (Spring) 3 credits
This course offers hands-on experience, a further look at in-depth rodent strains and characteristics, breeding schemes, environmental enrichments and identification methods. Humane care, handling, management and routine techniques and practices for each species used in research labs including: mice, rats, Syrian hamsters, rabbits, Xenopus frogs, African bullfrogs and Leopard frogs. Prereq: ANIMLSCI 455. Open to Junior/Senior ANSCI/PREVET majors only.

ANIMLSCI 472 – Infection and Immunity (Fall) 3 credits Introduction to animal diseases and immunity. Topics include infectious organisms, infection and the immune response, and specific diseases of selected companion and production species. Principles of vaccination and preventative management are discussed. Prereq: ANIMLSCI 285 or BIOCHEM 285 or BIOLOGY 285.

ANIMLSCI 491C – Biotechnology Research Experience III – Cellular & Molecular (Fall, Spring) 3 credits This course is a 3 credit discovery-based research tutorial experience emphasizing cellular and molecular approaches. See page 22 for departmental requirements for presenting your results. Students should meet with their potential faculty sponsor to discuss whether there are open positions, projects available, and how many hours of work in the lab or facility and outside are expected. Submit completed contract to mschneider@vasci.umass.edu or 427Z ISB to have course added to your schedule.

ANIMLSCI 491M – Biotechnology Research Experience III – Animal Models (Fall, Spring) 3 credits This course is a 3 credit discovery-based research tutorial experience emphasizing animal models. See page 22 for departmental requirements for presenting your results. Students should meet with their potential faculty sponsor to discuss whether there are open positions, projects available, and how many hours of work in the lab or facility and outside are expected. Submit completed contract to mschneider@vasci.umass.edu or 427Z ISB to have course added to your schedule.

ANIMLSCI 494 GI – Integrative Experience - Good Intentions (Spring) 3 credits
Focuses on understanding and solving problems that have arisen, at least in part, from human-animal interactions. While these interactions frequently originate with the best of intentions, the consequences are often unexpected and not very good. Through reading primary peer-reviewed literature as well as web postings, students will acquire the specific knowledge, which, combined with information from their previous courses in their major and general education classes, will form the basis for group and class discussions.

ANIMLSCI 494 PI - Problem-Based Learning in Advanced Animal Health and Management (Fall) 3 credits Open to ANSCI/PREVET majors only. Satisfies the Integrative Experience requirement for BS-AnSci majors and BS-Prevet majors. Real-world cases involving management and veterinary medicine for large animals, companion animals, and wildlife will be presented. With Instructor guidance, students will work to identify and solve problems posed by each case, while expanding their knowledge and developing skills in critical thinking, self-directed learning, written and oral presentation, and teamwork. Prereq: ANIMLSCI 103, 220, 285, 311, and 472/572. Instructor consent required.

ANIMLSCI 494 TI – Integrative Experience Integrating Learning and Research 1 credit This highly interactive seminar class is designed to enhance your Departmental Honors Thesis Experience by examining your general education acquired skills to more successfully participate in your thesis and to think more deeply about the impact general education courses have had on how you approach aspects of your individual capstone. Real-world skills and issues will be implemented and discussed including: organizing a departmental "how to get involved with research" night, debating the ethics of embryonic stem cell research and learning how to deliver effective research presentations. Prereq: 499Y refer to pages of 26-27 of this handbook.

ANIMLSCI 496 - Independent Study (Fall) (Spring) All faculty, by arrangement, 1-6 credits under the direct supervision of a UMass faculty sponsor, examples of appropriate independent study outputs include: papers, posters, oral reports or a portfolio of work. A 1 credit independent study course averages 3 hours of work per week over 15 weeks of the fall or spring semester, or 45 hours total per semester. Credits may vary from 1 to 6, or 3 (1 credit) to 18 (6 credits) hours of work per week. See page 23 for additional information Submit completed contract to mschneider@vasci.umass.edu or ISB 427Z to have course added to your schedule. Honors course - ANIMLSCI HI496 is also available. Can be taken for repeat credit.

ANIMLSCI 496T - Advanced Teaching in Animal Science (Fall) (Spring), All faculty, 1-2 credits Students gain experience in teaching all aspects of Animal Science courses. Students must have successfully completed the course and related pre-requisites for the course they plan to TA in. Students must submit an application and will be expected to demonstrate specific competencies related to labs and assisting students; and lead review sessions. For Moodle access, students must complete FERPA certification on SPIRE in Student Home > TA FERPA Agreement prior to requesting enrollment from instructor. Instructors send list of TA's to Undergraduate Program Office to add course to student's schedule. Pre-req: 4 credits of ANIMLSCI 396T. Repeatable once for credit.

ANIMLSCI 497L ST - Winter Traveling Dairy Management (January) 1 credit
This course is conducted collaboratively with other New England Land Grant institutions. Students and faculty collectively tour dairies and dairy related facilities during the first week in January. UMass students meet with the faculty advisor for a series of weekly discussion sessions to talk about each of the destinations. There is an additional fee; see instructor for scholarship application.

ANIMLSCI 497V – Clinical Animal Behavior (Fall) 1 credit
This course focuses on common domestic animals and their behavior. The interaction of the hormonal and physiological factors in animal behavior is also discussed. Ethological principles and methods are examined in lecture and field exercises. The recognition of normal versus abnormal animal behavior and prevention of behavior problems are emphasized. Animal learning theories and behavior modification techniques are also covered. An introduction to career options in animal behavior and professional organizations and publications is also included. Prereq: Grade of C or better in ANIMLSCI 105, ANIMLSCI 115 or ANIMLSCI 101 and ANIMLSCI 103

ANIMLSCI 498 - Practicum (Fall) (Spring) All faculty, by arrangement, 1-3 credits/semester Join Handshake - https://umass.joinhandshake.com/ complete contract with faculty advisor. Submit completed contract to mschneider@vasci.umass.edu or 427Z ISB to have course added to your schedule.

ANIMLSCI 498S - Equine Enterprise II (Spring) 3 credits - Continuation of Equine Enterprise I. Capstone experience will focus on improvements and efficiency of the equine boarding operation at the UMass Hadley Farm, weekly evaluation of strengths and weaknesses, client feedback, and marketing of the business. Required weekly meetings and student committee assignments. Lab time includes weekly shifts at the facility. End of semester student presentations of a comprehensive annual report. Prereq. ANIMLSCI 398S

ANIMLSCI 521 - Physiology of Reproduction (Spring) 4 credits with lab, lab fee
Comparative aspects of anatomy, embryology, endocrinology, and physiology of reproduction and lactation. Participation required. Prereq: ANIMLSCI 220 or equivalent.

ANIMLSCI H521 - Physiology of Reproduction with Honors Colloquium (Spring) 1 credit Comparative aspects of anatomy, embryology, endocrinology, and physiology of reproduction and lactation. The course covers the most recent cellular and molecular findings related to mammalian fertilization in depth as well as the technical and ethical issues associated with the application of newly developed assisted reproductive technologies such as intracytoplasmic sperm injection (ICSI) and cloning of animal stem cells. The application of these technologies is discussed whether it applies to animals of agricultural importance, wildlife, or humans. In addition, students are required to select a subject from one of the discussed topics in the class. This subject of choice must be then thoroughly researched followed by a 15 minute presentation towards the end of the course. Students will be graded based on class participation as well as the content and style of the presentation of the selected topic. Prereq: ANIMLSCI 220 or equivalent AND Previous or concurrent enrollment in ANIMLSCI 521.

ANIMLSCI 572 – Molecular Immunology (Spring) 3 credits
Introduction to immunology and how mammals utilize innate and adaptive mechanisms to control pathogenic organisms including bacteria, viruses, protozoa and helminths. Open to Juniors and Seniors only, or by consent of instructor. Prereq: ANIMLSCI 285 or BIOCHEM 285 or BIOLOGY 285.

ANIMLSCI 581H – Cancer Biology (Fall) 3 credits
This course will cover changes in the prevalence of cancer and contemporary diagnostics and treatments. While these have dramatically decreased mortality, cancer continues to claim more than 585,000 lives annually. Therefore, the focus will be on the mechanisms that are corrupted in cancer cells and the differences in vulnerability among tissues, the technologies used to define pathways and lessons learned. Equally important are the strategies being used to exploit the vulnerabilities of tumors for personalized and targeted therapeutics. Prereq: Molecular and Cellular Biology (ANIMLSCI 285 or BIOCHEM 285, BIOLOGY 285), Genetics (ANIMLSCI 311 or BIOLOGY 311) with a grade of C or better.

ANIMLSCI 596 - Independent Study (Fall) (Spring) All faculty, by arrangement
Under the direct supervision of a UMass faculty sponsor, examples of appropriate independent study outputs include: papers, posters, oral reports or a portfolio of work. A 1 credit independent study course averages 3 hours of work per week over 15 weeks of the fall or spring semester, or 45 hours total per semester. Credits may vary from 1 to 6, or 3 (1 credit) to 18 (6 credits) hours of work per week. See page 23 for additional information. Submit completed contract to mschneider@vasci.umass.edu or 427Z ISB to have course added to your schedule.

USE OF ANIMALS IN TEACHING

Animals are used in several courses to demonstrate the principles of animal management and to study various biological phenomena. At all times we strive to provide housing and care of animals as prescribed by guidelines of the National Institutes of Health and the United States Department of Agriculture. Whenever procedures are used to demonstrate livestock management practices or used in laboratory experimentation, every effort is made to minimize pain. Class use of animals is reviewed and approved by the Institutional Animal Care and Use Committee. Approved written protocols are on file in the Veterinary & Animal Sciences departmental office, 431A Integrated Science Building. The following are courses that utilize animals. Presented are the uses and procedures conducted. Students who find certain techniques personally objectionable may meet with the instructor at the start of the semester and arrange an alternative exercise. If there is no alternative to the laboratory exercise the student should not elect to take the class. The procedures that may be conducted on animals fall into the categories of: surgery, anesthesia, euthanasia, fasting, pain and injections. Only the procedures actually used will be presented in the discussion of each class.

ANIMLSCI 101 - Introduction to Animal Science - Animals are used to demonstrate common animal management practices. Animals used include: horses, cattle, sheep, goats, swine, and poultry.

ANIMLSCI 103 - Introduction to Animal Management - An introduction to animal management practices with hands-on experiences. Animals used include: horses, cattle, sheep, goats, swine and poultry. Procedures used on some animals are routine farm management practices that include: castration, ear tagging, tail docking, paint branding, ear notching, clipping needle teeth and injection of iron. Students should request alternative exercises at the start of the semester if they find these practices objectionable.

ANIMLSCI 220 – Anatomy and Physiology of Domestic Animals -The relationship between anatomical structure and function is emphasized. Preserved organs and models provide most of the anatomical material.

ANIMLSCI 231 (Fall) & ANIMLSCI 251 (Spring) - Dorset Sheep Management
Students will learn skills such as hoof trimming, vaccinating, parasite detection, pregnancy detection, lambing and neonatal care; make decisions regarding selection, breeding and culling and learn to recognize signs of illness and administer treatments.

ANIMLSCI 232 (Fall) & ANIMLSCI 252 (Spring) - Belted Galloway Management
Students will learn to perform practical management techniques such as handling, vaccinating, deworming, breeding, halter breaking, weaning, fitting and showing as well as observing the behavior of Belted Galloway cattle.

ANIMLSCI 233 (Fall) & ANIMLSCI 253 (Spring) – Boer Goat Management
Students will develop practical skills including: handling, feeding, vaccinating, breeding, assisting with the delivery of goat kids and assisting the herd veterinarian.

ANIMLSCI 234 (Fall) & ANIMLSCI 254 (Spring) - Poultry Management
Students will be responsible for all daily care including: feeding, cleaning, weekly weights, bird identification, moving the coops on pasture, record keeping, marketing and distributing the processed birds.

ANIMLSCI 236 (Fall) & ANIMLSCI 256 (Spring) – Equine Management
Students will be responsible for the day-today care of the university reproduction horse herd and develop practical skills including safe horse handling and restraint, feeding, grooming, vaccinating, deworming, body condition scoring, first aid and assist with foaling.

ANIMLSCI 297B ST – Artificial Insemination Certification - This course demonstrates and teaches artificial insemination of dairy and beef cattle. The instructor is a professional from the A.I. industry.

ANIMLSCI 297L & ANIMLSCI 297P – Bay State Livestock Classic - The grooming and showing of cattle, sheep, goats, poultry and horses are taught through hands-on experience.

ANIMLSCI 301 - Equine Behavior and Learning Theory - Ethology of the horse, methods and principles of training based on how the horse learns. Students will have some practical learning opportunities to develop horse handling skills.

ANIMLSCI 302 - Development and Training of the Horse - The training, physical and mental development of foals to 3 year old horses. Students will have demonstrations of practices learned in class.

ANIMLSCI 332 – Basic Animal Nutrition and Feeding - A ruminally cannulated cow is used to investigate digestive physiology of the fore-stomach. Various ciliated protozoa that colonize the rumen are examined and identified under a microscope. Additionally, the rumen is partially emptied in order to examine various rumen anatomical landmarks. Animals used in class may include cattle, horses, sheep and swine.

ANIMLSCI 333 – Equine, Cattle, and Companion Animal Nutrition - Students will collect and process manure samples from horses. Horses may also be used for body condition scoring and conducting basic feed trials.

ANIMLSCI 373 - Equine Diseases and Health Management
This course is directed towards hands on experience in the general management practices with emphasis on such topics as infectious and non-infectious diseases, wound care, vaccination, dental care, lameness detection, and parasite control.

ANIMLSCI 398D – Service Dog Training - Students are responsible for fostering and training a dog.

ANIMLSCI 398S - Equine Enterprise I - Students are responsible for the management and operation of the equine boarding facility at the Hadley Farm including caring for the horses.

ANIMLSCI 401 - Management of the Equine Athlete - Students learn to recognize equine lameness and perform basic gait analysis, neurologic examinations, and flexion tests. Students assist veterinarians with diagnostic procedures including radiography, ultrasonography, thermography, and endoscopy.

ANIMLSCI 402 - Equine Rehabilitation - Students assist with equine rehabilitation plans, including monitoring vitals, handwalking, hydrotherapy, cryotherapy, passive mobilization and stretching exercises, cold laser therapy, and extracorporeal shockwave therapy.

ANIMLSCI 421 – Wildlife Reproduction
Animals may be used for palpations and breeding demonstrations.

ANIMLSCI 432 – Advanced Animal Nutrition and Feeding
A ruminally cannulated cow is used to investigate digestive physiology of the fore-stomach. Various ciliated protozoa that colonize the rumen are examined and identified under a microscope. Additionally, the rumen is partially emptied in order to examine various rumen anatomical landmarks. Animals used in class may include cattle, horses, sheep and swine.

ANIMLSCI 445A - Equine Reproduction Lab - Hands on opportunities in equine reproduction; specifically: semen collection, preparation of the mare for breeding; teasing; and assisting in foaling.

ANIMLSCI 455 and ANIMLSCI 456 – Research Animal Management I and II
Students are taught humane care, handling and management of animals used in research. Techniques used in nutrition, breeding, disease control, gnotobiology, anesthesiology, surgery, and necropsy are studied. Common handling techniques are practiced. Animal used in labs include mice, rats, gerbils, hamsters, guinea pigs and rabbits.

ANIMLSCI 498S - Equine Enterprise II - Students are responsible for the management and operation of the equine boarding facility at the Hadley Farm including caring for the horses.

ANIMLSCI 521 – Physiology of Reproduction - Laboratory exercises are used in conjunction with lectures to demonstrate current methods and technologies used in developing successful reproductive management programs for domestic animals. Animals used include: cattle, swine, sheep, goats and horses.

PERSONNEL

College of Natural Sciences

Administration

Tricia Serio, ***Dean***
117 Stockbridge Hall, College of Natural Sciences 545-2766

Elizabeth Connor, Associate Dean for Undergraduate Education
College of Natural Sciences, Morrill Science Center II, 220 545-1969

Administrative Personnel

Academic Programs Office

Mary Schneider, Graduate & Undergraduate Program 577-1193
427Z Integrated Sciences Building mschneider@vasci.umass.edu

Lisa West, Undergraduate Program Coordinator & Website Manager 545-0666
427X Integrated Sciences Building lwest0@vasci.umass.edu

Business Office

Elaine Fuqua, Human Resources 545-2312
431A Integrated Sciences Building fuqua@vasci.umass.edu

Laura Looman, Financial Manager 545-2363
431A Integrated Sciences Building ljlooman@vasci.umass.edu

Linda Bramhall, Assistant Financial Manager 545-5557
431A Integrated Sciences Building lbramhall@umass.edu

Sara Atkinson, Student Employee 545-2363
431A Integrated Sciences Building student-vasci@umass.edu

Veterinary and Animal Sciences Department
University of Massachusetts Fax number – 545-6326
Integrated Sciences Building Email – Vasci@umass.edu
661 North Pleasant Street Web address – www.vasci.umass.edu
Amherst, MA 01003

Hadley Farm - **Equine and Livestock Research and Education Center**
111 North Maple Street, Hadley, MA 01035

UMass Crop and Animal Research and Education Farm
89-91 North River Road, South Deerfield, MA 01373

Robert Skalbite, UMass Farms Manager rskalbite@umass.edu
545-4800, 545-0143

Alice Newth**,** Hadley Farm Livestock Barn Manager newth@vasci.umass.edu
545-6034

Teresa Haire, Hadley Farm Equine Barn Manager thaire@cns.umass.edu
545-6030

Meghan Gennings, Hadley Farm Livestock and mgenning@umass.edu
Equine Barn Assistant Manager 545-6034, 545-6030

Neal Woodard, South Deerfield Farm nealw@psis.umass.edu

Keith Lilly, South Deerfield Farm klilly@vasci.umass.edu
413-665-3428

Department of Veterinary and Animal Sciences
Faculty Directory

Rafael A. Fissore, Professor
Department Head
427A Integrated Sciences Building
University of Massachusetts, Ph.D.
University of Buenos Aires, D.V.M. 545-5548
Specialty: Physiology of Reproduction rfissore@vasci.umass.edu

Dominique Alfandari, Professor
427B Integrated Sciences Building
University of Pierre & Marie Curie, Ph.D. 577-4269
Specialty: Developmental Biology alfandar@vasci.umass.edu

Kathleen F. Arcaro, Professor
N225 Life Sciences Laboratories
Rutgers University, Ph.D. 577-1823
Specialty: Environmental Toxicology karcaro@vasci.umass.edu

Cynthia Baldwin, Professor
Graduate Program Director
427E Integrated Sciences Building
Cornell University, Ph.D. 545-3167
Specialty: Virology and Microbiology cbaldwin@vasci.umass.edu

Klaus Becker, Lecturer
427X Integrated Sciences Building
University of Massachusetts, Amherst Ph.D. kbecker@umass.edu
Specialty: Genetics and Human Stem Cells

Katherine A. Beltaire, Lecturer
UMass Farms Clinical Veterinarian
427ZZ Integrated Sciences Building
Tufts University, D.V.M. 545-2428
Specialty: Veterinary Medicine and Reproduction kbeltaire@vasci.umass.edu

Samuel J. Black, Professor Emeritus
427J Integrated Sciences Building
Edinburgh University, Ph.D. 545-2573
Specialty: Immunology & Infectious Diseases sblack@vasci.umass.edu

Amy Burnside, Research Assistant Professor
Flow Cytometry Core Facility Manager
University of Massachusetts, Ph.D. 545-1385
Specialty: FACS Instrumentation aburnsid@vasci.umass.edu

John Marshall Clark, Professor
Director of Massachusetts Pesticide Analysis Laboratory
N311A Morrill 1 Science Center
Michigan State University, Ph.D. 545-1052
Specialty: Environmental Toxicology & Chemistry jclark@vasci.umass.edu

Hélène Cousin, Lecturer
427N Integrated Sciences Building
University of Pierre & Marie Curie, Ph.D. 577-1156
Specialty: Developmental Biology hcousin@vasci.umass.edu

Wei Cui, Extension Assistant Professor
S521 Life Sciences Building 545-0673
Shandong Agricultural University, Ph.D. wcui@umass.edu
Specialty: Mammalian oocyte and preimplantation embryo development

Karen Dunphy, Research Assistant Professor & Lecturer
427H Integrated Sciences Building
University of Massachusetts, Ph.D. 545-2427
Specialty: Genetics of Cancer and Mammary kdunphy@vasci.umass.edu
Gland Development and Differentiation

Maria Gracia Gervasi**,** Lecturer
427 Center B Integrated Sciences Building
University of Buenos Aires, Ph.D. mariagracia@vasci.umass.edu
Specialty: Sperm capacitation and early embryo development

Carlos Gradil, Extension Professor
Equine Studies Program Coordinator
427Q Integrated Sciences Building
University of Minnesota, Ph.D., University of Lisbon, Portugal, D.V.M 577-2214
Specialty: Equine Reproduction & Reproductive Services cgradil@vasci.umass.edu

Mark T. Huyler, Senior Lecturer
427T Integrated Sciences Building
Washington State University, Ph.D. 545-2344
Specialty: Livestock Management and Nutrition mhuyler@vasci.umass.edu

D. Joseph Jerry, Professor
Science Director, PVLSCI
427P Integrated Sciences Building
Pennsylvania State University, Ph.D. 545-2428
Specialty: Genetics of Cancer, Lactation Physiology jjerry@vasci.umass.edu
& Mammary Gland Development and Differentiation

Sarah Lefebvre, Lecturer
Associate Program Director of Veterinary Technology
UMass Mt. Ida Campus (617) 243-1612
Mississippi State University, D.V.M. slebvre@umass.edu
Specialty: Feline & Canine Medicine, Exotic Animal Medicine, Clinical Animal Behavior

Susan Leschine, Professor Emerita
N567 Life Sciences Laboratories
University of Pittsburgh, Ph.D. 545-0673
Specialty: Microbial Physiology, Technologies leschine@vasci.umass.edu
for Animal Health, Agriculture & the Environment

Jesse Mager, Professor
Chair of Institutional Animal Care and Use Committee
427M Integrated Sciences Building
University of North Carolina, Ph.D. 545-7368
Specialty: Developmental Epigenetics jmager@vasci.umass.edu

Susan Marston, Lecturer
Chief Undergraduate Advisor
427U Integrated Sciences Building
University of New Hampshire, Ph.D. 545-2641
Specialty: Dairy Nutrition and Management smarston@vasci.umass.edu

Lisa M. Minter, Associate Professor
427K Integrated Sciences Building
University of Massachusetts, Ph.D. 545-1364
Specialty: Cellular Immunology and Cell Death lminter@vasci.umass.edu

Barbara A. Osborne, Professor
427F Integrated Sciences Building
Stanford University, Ph.D. 545-4882
Specialty: Immunoglobulin Gene Diversification osborne@vasci.umass.edu
and Programmed Cell Death

Sandra Petersen**,** Professor
N231 Life Sciences Laboratories
Oregon State University, Ph.D. 545-1808
Specialty: Molecular Neuroendocrinology of Reproduction spetersen@vasci.umass.edu

Elena Pobezinskaya, Research Assistant Professor
427 ZA Integrated Sciences Building
Cancer Research Center Moscow, Russia, Ph.D. 545-2405
Specialty: The role of miRNAs in cancer pobezinskaya@umass.edu

Leonid A. Pobezinsky, Assistant Professor
427G Integrated Sciences Building
N.N. Blokhin Cancer Research Center Moscow, Russia, Ph.D. 545-2393
Specialty: Non-coding RNAs in the immune system pobezinsky@umass.edu

Amy Rubin, Lecturer
Veterinary Technology Program Director
427ZB Integrated Sciences Building 413-687-3031
The Ohio State University, D.V.M. ajrubin@umass.edu

Ana Maria Salicioni, Research Assistant Professor
427S Integrated Sciences Building
University of San Luis, Argentina, Ph.D. 577-3315
Specialty: Cancer, Reproductive Biology & Signaling asalicioni@vasci.umass.edu

Jillianne R. Smith, Lecturer
427ZD Integrated Sciences Building 781-603-4521
University of Massachusetts Amherst, B.S. jrsmith@umass.edu
Specialty: Equine Behavior, Equitation Science, Certified Equine Rehabilitation Practitioner

Sallie Smith-Schneider, Adjunct Assistant Professor
PVLSI at Baystate Medical Center, Springfield
University of Massachusetts Amherst, Ph.D. 413-794-0941
Specialty: Mammary Gland Development & Cancer sallie.schneider@baystatehealth.org

Janice C. Telfer, Professor
Undergraduate Program Director
427D Integrated Sciences Building
Harvard Medical School, Ph.D. 545-5564
Specialty: Lymphocyte Maturation & Developmental Immunology telfer@vasci.umass.edu

Kimberly D. Tremblay, Associate Professor
Honors Program Director
427C Integrated Sciences Building
University of Pennsylvania, Ph.D. 545-5560
Specialty: Organogenesis kdtrembl@vasci.umass.edu

Cassandra K. Uricchio, Senior Lecturer
427ZC Integrated Sciences Building 345-0183
North Carolina State University, Ph.D. curicchio@umass.edu
Specialty: Equine Nutrition, Certified Equine Rehabilitation Practitioner

Pablo E. Visconti, Professor
427W Integrated Sciences Building
Instituto de Biologia y Medicina Experimental Buenos Aires, Ph.D. 545-5565
Specialty: Physiology of Reproduction, Signaling in Sperm pvisconti@vasci.umass.edu

Daniel P. Young, Lecturer
Mount Ida Campus Attending Veterinarian
110 Veterinary Technology Building
The Ohio State University, D.V.M. 617-243-1614
Specialty: Veterinary Medicine and Surgery dpyoung@umass.edu

The information in this handbook is subject to updates and modifications.