

PATHO-BIOLOGICAL SCIENCES (PATH-BIO)

PATH-BIO 150 – CONTEMPORARY TOPICS AND CAREERS IN THE VETERINARY SCIENCES

1 credit.

Topics of importance to the animal health field.

Requisites: None

Repeatable for Credit: No

Last Taught: Fall 2024

Learning Outcomes: 1. Articulate multiple career paths that a person can take if interested in a career in animal health and veterinary medicine.

Audience: Undergraduate

2. Describe the requirements and process for applying to veterinary medical school.

Audience: Undergraduate

3. Understand how to engage in career exploration.

Audience: Undergraduate

PATH-BIO/PATH 210 – HIV: SEX, SOCIETY AND SCIENCE

3 credits.

HIV kills three million people per year, more than any other infectious disease. We will learn about the transmission, immunology, virology, vaccinology and societal impact of this virus. Six of the world's leading HIV scientists will give guest lectures.

Requisites: None

Course Designation: Breadth – Biological Sci. Counts toward the Natural Sci req

Level - Elementary

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Fall 2024

Learning Outcomes: 1. Use science as a tool for understanding the world and solving problems.

Audience: Undergraduate

2. Understand how scientific data, social context, and political decisions impact prevention and treatment of infectious diseases in different community contexts.

Audience: Undergraduate

3. Identify obstacles to implementing effective disease interventions and understand ways to evaluate those interventions.

Audience: Undergraduate

4. Describe the steps of the HIV viral life cycle.

Audience: Undergraduate

5. Discuss how HIV's replication process leads to immune deficiency and AIDS.

Audience: Undergraduate

6. Describe immune responses against viral infection and list reasons why these responses fail to clear HIV infection.

Audience: Undergraduate

7. List reasons why it is challenging to cure HIV infection.

Audience: Undergraduate

8. Discuss approaches for making vaccines against other pathogens and list reasons why it is challenging to apply these approaches to HIV.

Audience: Undergraduate

9. Discuss and evaluate approaches for slowing the spread of HIV in the United States and other countries.

Audience: Undergraduate

10. Describe the processes by which HIV emerged to become a human pathogen.

Audience: Undergraduate

11. Discuss the sources of funding for the global response to HIV/AIDS and evaluate the efficacy of each in achieving its goals.

Audience: Undergraduate

12. Apply the concepts learned in relation to HIV to other emerging and re-emerging pathogens, such as Ebola virus, Zika virus, and/or SARS-CoV-2.

Audience: Undergraduate

PATH-BIO 299 – INDEPENDENT STUDY

1-3 credits.

Requisites: Consent of instructor

Repeatable for Credit: Yes, unlimited number of completions

Last Taught: Fall 2024

Learning Outcomes: 1. Summarize intellectual growth associated with independent study work through mentor discussion

Audience: Undergraduate

2. Identify diversity of viewpoints through critical thinking

Audience: Undergraduate

3. Illustrate growth in reading, writing, and communication skills

Audience: Undergraduate

PATH-BIO 307 – SUPERBUGS, SEX, & DRUGS: WHY MODERN MEDICINE NEEDS EVOLUTIONARY BIOLOGY

2 credits.

Explore the new frontier of evolutionary and ecological solutions to public health challenges through analyses and discussions. Evolution is often viewed as a purely historical topic disconnected from modern practical concerns. This view is incomplete: evolution plays a key role in many areas of modern life and underlies many public health challenges like drug resistance in bacteria and cancer, vaccine development, circadian medicine, and the 'spill-over' of pathogens from wildlife to humans (and vice versa). These issues, however, are intricately connected to social drivers like the use of antibiotics to treat viruses or as growth promoters in livestock. More evolutionary-guided solutions to understanding and addressing these challenges are critical for a sustainable and healthy future.

Requisites: (ZOOLOGY/BIOLOGY/BOTANY 151, BOTANY/BIOLOGY 130, ZOOLOGY/BIOLOGY 101, 102, or BIOCORE 381) and sophomore standing

Course Designation: Breadth – Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Learning Outcomes: 1. Investigate the myriad ways in which a new (evolution-informed) way of looking at the world of veterinary and human medicine and public health is beneficial and necessary for modern medicine.

Audience: Undergraduate

2. Compare how goals of personal medicine and public health are similar and dissimilar.

Audience: Undergraduate

3. Evaluate case studies to compare how evolutionary principles can be used to improve standard approaches to treating cancer and drug resistant sexually transmitted infections, STIs.

Audience: Undergraduate

4. Articulate the consequences of pathogen evolution for disease outbreaks and control.

Audience: Undergraduate

5. Describe the genetic and behavioral reasons why there are increasing numbers of antibiotic resistant infections.

Audience: Undergraduate

6. Read and analyze data on the health status of populations.

Audience: Undergraduate

7. Critically evaluate and effectively use textbooks, current research literature, online information, as well as information related to scientific and biological issues in the popular press.

Audience: Undergraduate

PATH-BIO/ENTOM/M M & I/ZOOLOGY 350 – PARASITOLOGY

3 credits.

The biology of water-borne, food-borne, soil-borne and vector-borne parasites of animals including humans. Parasites are explored in the context of transmission, associated disease, diagnosis and treatment options, and environmental, cultural and socioeconomic drivers of disease epidemiology.

Requisites: ZOOLOGY/BIOLOGY 101 and 102, or ZOOLOGY/BIOLOGY/BOTANY 152 or ZOOLOGY 153, or BIOCORE 381

Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Spring 2025

Learning Outcomes: 1. Be conversant in terminology used in the field of Parasitology.

Audience: Undergraduate

2. Recall scientific and common names for parasites and hosts, and the name of the resulting disease in humans or animals.

Audience: Undergraduate

3. Attribute parasite behavior and characteristics to specific disease features in the host.

Audience: Undergraduate

4. Identify appropriate means to diagnose infections with parasites.

Audience: Undergraduate

5. Describe and identify factors that determine when, where, and why parasitic diseases exist.

Audience: Undergraduate

6. Integrate terminology, scientific nomenclature, diagnostic features and demographics to solve case studies where the parasitic culprit is unknown.

Audience: Undergraduate

7. Compare and contrast commonalities in parasite life cycles to demonstrate how flexibility in those life cycles has resulted in many different potential means of transmission.

Audience: Undergraduate

8. Deconstruct the impact of parasitic diseases on human and animal health, from disease symptoms and pathology in an individual, to socioeconomics in communities and countries.

Audience: Undergraduate

9. Identify reliable resources (primarily internet-based) available for researching the biology and epidemiology parasitic diseases.

Audience: Undergraduate

PATH-BIO/MED HIST 370 – ADDRESSING CONTROVERSY: THE SCIENCE, ETHICS, AND PUBLIC DISCUSSION OF ANIMAL RESEARCH

3 credits.

Addresses the science, ethics, history, and communication strategies associated with the use of animals in research. Seeks to identify and employ common ground among those with different perspectives to enable students to make good decisions about this contentious topic.

Requisites: Satisfied Communications A requirement

Course Designation: Gen Ed - Communication Part B

Breadth - Either Humanities or Natural Science

Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Spring 2024

Learning Outcomes: 1. Identify and employ communication practices that encourage tolerant and non-threatening discussion of controversial topics.

Audience: Undergraduate

2. Explain how scientific knowledge is acquired, with special reference to research with animals.

Audience: Undergraduate

3. Explain and compare ethical principles associated with animal use in research.

Audience: Undergraduate

4. Explore and apply principles of effective communication of complex and value-laden science.

Audience: Undergraduate

5. Describe the history and evaluate the present status of the animal research controversy.

Audience: Undergraduate

6. Construct and critique written and verbal presentations about animal research.

Audience: Undergraduate

7. Refine and defend your own position on animal research in a respectful and non-judgmental way that encourages additional dialog.

Audience: Undergraduate

8. Identify common ground among differing perspectives on animal research, and develop best practices for communicating this subject to diverse audiences.

Audience: Undergraduate

9. Practice critical reading, logical thinking, and the use of evidence.

Audience: Undergraduate

10. Employ appropriate style and disciplinary conventions in writing and speaking.

Audience: Undergraduate

11. Learn to use core library resources specific to the discipline.

Audience: Undergraduate

PATH-BIO 510 – VETERINARY IMMUNOLOGY

3 credits.

Current concepts in basic and clinical immunology with special emphasis on domesticated species and aspects of immunology.

Requisites: Declared in Doctor of Veterinary Medicine with second year standing

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Fall 2024

Learning Outcomes: 1. Discuss and apply how the immune system in a healthy animal protects its host from infection and neoplasia.

Audience: Graduate

2. Discuss and apply the mechanisms underlying the failure of the body's defenses to protect against infections and neoplasia.

Audience: Graduate

3. Discuss and apply the mechanisms and consequences of over-reactions of the immune system.

Audience: Graduate

4. Discuss and apply how immune system can be manipulated by vaccination to protect against infections and other strategies to combat transplant rejection and treat cancer.

Audience: Graduate

5. Discuss and apply the immunological principles of diagnostic tests and how to interpret the results

Audience: Graduate

PATH-BIO 512 – INTRODUCTION TO VETERINARY EPIDEMIOLOGY

2 credits.

Learn basic concepts and approaches to population problems in veterinary medicine. Methods appropriate to investigation of disease outbreaks, surveillance of animal disease and production and the design of epidemiological studies of the determinants of disease are presented.

Requisites: Declared in Doctor of Veterinary Medicine with second year standing

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Fall 2024

Learning Outcomes: 1. Apply the principles of causal inference to health-related outcomes

Audience: Graduate

2. Recognize the effects of bias, confounding and interaction on medical research

Audience: Graduate

3. Assess and evaluate health-related risk

Audience: Graduate

4. Measure and analyze patterns of health-related outcomes in populations

Audience: Graduate

5. Interpret diagnostic test results

Audience: Graduate

6. Evaluate the validity of medical information

Audience: Graduate

7. Communicate medical and scientific information to clients and the public.

Audience: Graduate

PATH-BIO 513 – VETERINARY VIROLOGY

2 credits.

Introduction to basic concepts in virology and covers biology and pathogenesis of viral diseases of animals with an emphasis on viruses important to veterinary medicine.

Requisites: Declared in Doctor of Veterinary Medicine with second year standing

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Fall 2024

Learning Outcomes: 1. Apply basic concepts of virology, including structure, replication strategies, pathogenesis, evolution, and antiviral therapy, to viral diseases

Audience: Graduate

2. Recall viral diseases and prion diseases of animals that are important in veterinary medicine and as zoonoses, describing clinical disease, prevention and control

Audience: Graduate

3. Integrate knowledge of pathogenesis to describe pathophysiology of viral diseases

Audience: Graduate

4. Apply concepts of diagnostic testing to diagnose viral diseases

Audience: Graduate

5. Analyze primary veterinary literature in the context of viral diseases

Audience: Graduate

6. Communicate concepts of viral diseases to a defined audience, such as clients, public health, or veterinary professionals

Audience: Graduate

7. Identify viral diseases that are considered foreign animal diseases

Audience: Graduate

PATH-BIO 514 – VETERINARY PARASITOLOGY

3 credits.

Basic veterinary parasitology with emphasis on biology, diagnosis, pathophysiology, treatment and management of parasitic infections of veterinary importance.

Requisites: Declared in Doctor of Veterinary Medicine with first year standing

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2025

Learning Outcomes: 1. Name and classify important veterinary parasite species by their scientific and/or common names, as appropriate.

Audience: Graduate

2. Recognize parasites based on the morphological features of different stages. Recognize the general size, shape, and diagnostic features of adults, larvae, eggs, cysts, etc.

Audience: Graduate

3. Identify how parasites of veterinary importance are transmitted.

Describe salient features of the life cycles of these parasites, including as definitive hosts, intermediate hosts, paratenic hosts, infective parasite stages, prepatent and patent periods, etc.; other factors influencing transmission such as host environment, diet, season, etc.

Audience: Graduate

4. Discuss the effects of parasites on their hosts. Describe the conditions under which disease is produced, the clinical signs and characteristics of disease, the role of host immunity, pathogenic mechanisms, and parasite stages responsible for pathology.

Audience: Graduate

5. Explain how parasite infections are diagnosed, treated and controlled. Describe techniques of diagnosis, availability and efficacy of treatment, and the respective roles of different methods of control (e.g., vector control, management practices, chemotherapy).

Audience: Graduate

PATH-BIO 515 – REGULATORY VETERINARY MEDICINE AND PUBLIC HEALTH

2 credits.

Role and regulatory obligations of the veterinary profession in preventing zoonoses, understanding the need for judicious use of antibiotics, and promoting the safety of food of animal origin.

Requisites: Declared in Doctor of Veterinary Medicine with third year standing

Repeatable for Credit: No

Last Taught: Spring 2025

Learning Outcomes: 1. Summarize and compare the clinical presentations of selected zoonotic diseases in both animals and humans.

Audience: Undergraduate

2. Explain at a technical level, and in a language appropriate for educating clients, the role(s) that animals play in disease transmission and the relative risks for human infections posed by contact with animals.

Audience: Undergraduate

3. Uphold the premise that “One Health” is an important framework for addressing important public health challenges and describe the ways that veterinarians are involved.

Audience: Undergraduate

4. Outline the roles and responsibilities of veterinarians and government agencies in animal importation, response to disasters, animal abuse, and the control of zoonotic and animal diseases.

Audience: Undergraduate

5. Outline the roles played by veterinarians in the safety of food of animal origin and how carcasses are processed and inspected.

Audience: Undergraduate

6. Explain ways that veterinarians work to decrease antibiotic and other drug residues in food products and stem the emergence of antibiotic resistance through careful stewardship of antibiotics.

Audience: Undergraduate

PATH-BIO 517 – VETERINARY BACTERIOLOGY AND MYCOLOGY

4 credits.

Emphasis on the pathogenesis of bacterial and fungal diseases of animals. Become familiar with the methods used to identify representative bacterial and fungal pathogens.

Requisites: Declared in Doctor of Veterinary Medicine with second year standing

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Fall 2024

Learning Outcomes: 1. Construct a valid differential diagnosis list of bacterial or fungal organisms contributing to disease, given a patient signalment, presenting complaint, physical examination, and pertinent laboratory data.

Audience: Graduate

2. Describe methods for proper collection and transport of samples for bacterial or fungal culture and identification.

Audience: Graduate

3. Perform basic laboratory tests for identification of bacterial and fungal species (e.g. streak a bacterial culture plate, Gram stain, microscopic identification of bacterial and fungal organisms).

Audience: Graduate

4. Prepare an appropriate diagnostic plan and interpret diagnostic test results for bacterial and fungal organisms.

Audience: Graduate

5. Describe important features of treatment for bacterial and fungal diseases of veterinary species.

Audience: Graduate

6. Discuss the importance of proper disinfection techniques for prevention of bacterial and fungal diseases.

Audience: Graduate

PATH-BIO 525 – ACTIVE, INTEGRATED LEARNING I

1 credit.

Active Learning experience highlighting problem solving and critical thinking that horizontally and vertically integrates material from other veterinary medicine courses by using exercises constructed in the context of clinical cases or scenarios.

Requisites: Declared in Doctor of Veterinary Medicine with second year standing

Repeatable for Credit: No

Last Taught: Fall 2024

Learning Outcomes: 1. Create medical problem lists for individual animals and groups of animals using information collected from the signalment, history, physical examination, laboratory tests, diagnostic imaging, and additional ancillary tests and investigations.

Audience: Undergraduate

2. Develop a comprehensive differential diagnosis based on the presenting complaint, that is organized by body system or mechanisms of disease, and select relevant disorders for a ranked differential diagnosis based on collected evidence.

Audience: Undergraduate

3. Develop a diagnostic plan based on the ranked differential diagnosis.

Audience: Undergraduate

4. Prepare rounds presentations (short summaries), in an organized and succinct manner using medical terminology, that can be used for clinical presentations or with submissions for ancillary testing.

Audience: Undergraduate

5. Replicate these analytical problem-solving skills for diverse animal species that present with various complaints.

Audience: Undergraduate

6. Capitalize on the strengths of teams that are diverse in experience, interest, and problem-solving preference to explain and communicate complex clinical problems in a respectful and responsible manner.

Audience: Undergraduate

PATH-BIO 526 – ACTIVE, INTEGRATED LEARNING II

1 credit.

Active Learning experience highlighting problem solving and critical thinking that horizontally and vertically integrates material from other veterinary medicine courses by using exercises constructed in the context of clinical cases or scenarios.

Requisites: Declared in Doctor of Veterinary Medicine with second year standing

Repeatable for Credit: No

Last Taught: Spring 2025

Learning Outcomes: 1. Create medical problem lists for individual animals and groups of animals using information collected from the signalment, history, physical examination, laboratory tests, diagnostic imaging, and additional ancillary tests and investigations.

Audience: Undergraduate

2. Develop a comprehensive differential diagnosis based on the presenting complaint, that is organized by body system or mechanisms of disease, and select relevant disorders for a ranked differential diagnosis based on collected evidence.

Audience: Undergraduate

3. Develop a diagnostic plan based on the ranked differential diagnosis.

Audience: Undergraduate

4. Prepare rounds presentations (short summaries), in an organized and succinct manner using medical terminology, that can be used for clinical presentations or with submissions for ancillary testing.

Audience: Undergraduate

5. Replicate these analytical problem-solving skills for diverse animal species that present with various complaints.

Audience: Undergraduate

6. Capitalize on the strengths of teams that are diverse in experience, interest, and problem-solving preference to explain and communicate complex clinical problems in a respectful and responsible manner.

Audience: Undergraduate

PATH-BIO/M M & I 528 – IMMUNOLOGY

3 credits.

Development and functions of immune response in animals; a comprehensive study of experimental humoral and cellular immunity.

Requisites: (CHEM 104 or CHEM 109) and (ZOOLOGY/BIOLOGY 101, ZOOLOGY/BIOLOGY/BOTANY 151 or BIOCORE 383), or graduate/professional standing

Course Designation: Level - Intermediate

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: No

Last Taught: Fall 2024

Learning Outcomes: 1. Identify lymphatic tissues and describe their functions

Audience: Undergraduate

2. Differentiate between innate and adaptive immune responses

Audience: Undergraduate

3. State the products of B and T cell activation in adaptive immunity

Audience: Undergraduate

4. Describe the steps in B and T cell activation and the immune mechanisms regulating their activity

Audience: Undergraduate

5. Explain how the adaptive immune system recognizes diverse antigens

Audience: Undergraduate

6. Summarize coordination of innate and adaptive immune responses in host defense against cancer and infectious diseases

Audience: Undergraduate

7. List examples of when the immune system goes awry (hypersensitivity, autoimmunity)

Audience: Undergraduate

8. Apply course concepts to design new therapies for cancer, infectious disease, or organ transplant

Audience: Undergraduate

PATH-BIO 559 – VETERINARY GENERAL PATHOLOGY

2 credits.

General mechanisms of disease at the cellular, tissue, organ, and organismal levels. Cell injury and cell death, neoplasia, inflammation, circulation, and genetics.

Requisites: Declared in Doctor of Veterinary Medicine with second year standing

Repeatable for Credit: No

Last Taught: Fall 2024

Learning Outcomes: 1. Describe gross and microscopic changes seen in tissues and organs and understand the underlying processes making them appear the way they do

Audience: Undergraduate

2. Identify tissues and organs and summarize the abnormalities present

Audience: Undergraduate

3. Interpret the gross and microscopic changes utilizing the language of pathology by formulating a morphologic diagnosis

Audience: Undergraduate

4. Apply important pathologic concepts and principles to draw conclusions about the pathogenesis of the changes they see

Audience: Undergraduate

5. Integrate clinical, historical, clinicopathologic, imaging results, and pathologic findings and draw conclusions relevant to the disease or process affecting the animal

Audience: Undergraduate

PATH-BIO 560 – VETERINARY SYSTEMIC PATHOLOGY I

2 credits.

Morphological manifestations of disease in animals. Diseases and disease processes will be discussed by organ system, stressing important diseases in domestic animals.

Requisites: Declared in Doctor of Veterinary Medicine with second year standing

Repeatable for Credit: No

Last Taught: Fall 2024

Learning Outcomes: 1. Describe gross and microscopic changes seen in tissues and organs and understand the underlying processes making them appear the way they do

Audience: Undergraduate

2. Identify tissues and organs and summarize the abnormalities present

Audience: Undergraduate

3. Interpret the gross and microscopic changes utilizing the language of pathology by formulating a morphologic diagnosis

Audience: Undergraduate

4. Apply important pathologic concepts and principles to draw conclusions about the pathogenesis of the changes they see

Audience: Undergraduate

5. Integrate clinical, historical, clinicopathologic, imaging results, and pathologic findings and draw conclusions relevant to the disease or process affecting the animal

Audience: Undergraduate

6. Identify what are common, usual, and typical aspects of pathology within each organ system

Audience: Undergraduate

7. Discuss common or important diseases and where appropriate identify specific etiologies associated with them

Audience: Undergraduate

PATH-BIO 561 – VETERINARY SYSTEMIC PATHOLOGY II

4 credits.

Morphological manifestations of disease in animals. Diseases and disease processes will be discussed by organ system, stressing important diseases in domestic animals.

Requisites: Declared in Doctor of Veterinary Medicine with second year standing

Repeatable for Credit: No

Last Taught: Spring 2025

Learning Outcomes: 1. Describe gross and microscopic changes seen in tissues and organs and understand the underlying processes making them appear the way they do

Audience: Undergraduate

2. Identify tissues and organs and summarize the abnormalities present

Audience: Undergraduate

3. Interpret the gross and microscopic changes utilizing the language of pathology by formulating a morphologic diagnosis

Audience: Undergraduate

4. Apply important pathologic concepts and principles to draw conclusions about the pathogenesis of the changes they see

Audience: Undergraduate

5. Integrate clinical, historical, clinicopathologic, imaging results, and pathologic findings and draw conclusions relevant to the disease or process affecting the animal

Audience: Undergraduate

6. Identify what are common, usual, and typical aspects of pathology within each organ system

Audience: Undergraduate

7. Discuss common or important diseases and where appropriate identify specific etiologies associated with them

Audience: Undergraduate

PATH-BIO 562 – VETERINARY CLINICAL PATHOLOGY

4 credits.

Concepts and techniques of clinical pathology with emphasis on those procedures that are important in the diagnosis of animal diseases.

Requisites: Declared in Doctor of Veterinary Medicine with second year standing

Repeatable for Credit: No

Last Taught: Spring 2025

Learning Outcomes: 1. Describe the principles for routine laboratory tests in hematology, hemostasis, urinalysis, clinical chemistry, endocrinology, and cytology, including the principles of quality control and preanalytical, analytical, and post-analytical variables that may affect test results.

Audience: Undergraduate

2. Demonstrate technical skills in preparing a diagnostic blood smear, performing a complete urinalysis and microhematocrit centrifugation for the measurement of packed cell volume and total protein by refractometry, and microscopically evaluating peripheral blood smears, urine sediments, and cytologic specimens.

Audience: Undergraduate

3. Interpret test results, including microscopic findings, by integrating information from the signalment, history, and physical examination, and organize a complete, but succinct, problem list using correct medical terminology for animal patients.

Audience: Undergraduate

4. Based on the established problem list, identify relevant differential diagnosis(es) or conclusion(s) and suggest appropriate ancillary testing to gather evidence toward a final diagnosis.

Audience: Undergraduate

5. List the essential/supporting evidence for your diagnosis/conclusion and explain the relevant pathophysiologic mechanism(s) using appropriate medical terminology.

Audience: Undergraduate

6. Support the learning of your peers while clarifying and solidifying your own knowledge by working in teams within the laboratory and on course exercises.

Audience: Undergraduate

PATH-BIO 660 – VETERINARY NECROPSY ROTATION

2 credits.

Provides experience with necropsy procedures in all animal species and in developing interpretive skills by participating in the School of Veterinary Medicine/Veterinary Medical Teaching Hospital diagnostic anatomic pathology service under the guidance of the faculty.

Requisites: Declared in Doctor of Veterinary Medicine with fourth year standing

Repeatable for Credit: No

Last Taught: Spring 2025

Learning Outcomes: 1. Perform accurate and complete routine gross necropsy procedures, methods, and techniques.

Audience: Undergraduate

2. Describe and interpret gross morphologic lesions and clearly, concisely, and accurately record these in a written report.

Audience: Undergraduate

3. Select and sample tissues for histopathological examination using proper technique.

Audience: Undergraduate

4. Select and sample specimens for ancillary procedures (e.g., cytology, bacteriology, virology, etc.).

Audience: Undergraduate

5. Correlate pathologic changes with clinical, clinicopathological, imaging, and other findings, to better understand and explain disease pathogenesis.

Audience: Undergraduate

6. Differentiate between normal anatomy and anatomic differences (between individuals and between species), and postmortem autolysis, artifactual changes, and true pathological lesions.

Audience: Undergraduate

PATH-BIO 675 – SPECIAL TOPICS

1-5 credits.

Topics vary.

Requisites: Declared in Doctor of Veterinary Medicine

Repeatable for Credit: Yes, unlimited number of completions

Last Taught: Spring 2025

Learning Outcomes: 1. Develop competence and professional skills in veterinary medicine

Audience: Undergraduate

2. Explore current topics and trends in veterinary medicine

Audience: Undergraduate

3. Developing breadths of experiences related to veterinary medicine

Audience: Undergraduate

PATH-BIO 681 – SENIOR HONORS THESIS I

2-4 credits.

Individual research and study in pathobiological sciences for completing an honors thesis as arranged with a faculty member.

Requisites: Consent of instructor

Course Designation: Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Honors - Honors Only Courses (H)

Repeatable for Credit: No

Last Taught: Spring 2022

Learning Outcomes: 1. Articulate a clear research question or problem and formulate a hypothesis

Audience: Undergraduate

2. Demonstrate technical mastery of a research methodology

Audience: Undergraduate

3. Define and use terminology and concepts specific to their research topic

Audience: Undergraduate

4. Demonstrate competence and confidence in searching for existing research relevant to their project

Audience: Undergraduate

5. Explain how their project adds to knowledge gaps in the field

Audience: Undergraduate

6. Apply problem solving skills to address research hurdles

Audience: Undergraduate

7. Work collaboratively with other researchers in the laboratory (including other trainees, staff and the PI)

Audience: Undergraduate

8. Demonstrate growth in working autonomously over the course of the 681/682 enrollment period

Audience: Undergraduate

9. Explain their research to others in the field and to broader audiences in research presentations

Audience: Undergraduate

10. Articulate the relevance of their research to their professional future and speak to project-specific learning outcomes established with their research instructor and mentor

Audience: Undergraduate

PATH-BIO 682 – SENIOR HONORS THESIS II

2-4 credits.

Individual research and study in pathobiological sciences for completing an honors thesis as arranged with a faculty member.

Requisites: Consent of instructor

Course Designation: Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Honors - Honors Only Courses (H)

Repeatable for Credit: No

Learning Outcomes: 1. Articulate a clear research question or problem and formulate a hypothesis

Audience: Undergraduate

2. Demonstrate technical mastery of a research methodology

Audience: Undergraduate

3. Define and use terminology and concepts specific to their research topic

Audience: Undergraduate

4. Demonstrate competence and confidence in searching for existing research relevant to their project

Audience: Undergraduate

5. Explain how their project adds to knowledge gaps in the field

Audience: Undergraduate

6. Apply problem solving skills to address research hurdles

Audience: Undergraduate

7. Work collaboratively with other researchers in the laboratory (including other trainees, staff and the PI)

Audience: Undergraduate

8. Demonstrate growth in working autonomously over the course of the 681/682 enrollment period

Audience: Undergraduate

9. Explain their research to others in the field and to broader audiences in research presentations

Audience: Undergraduate

10. Articulate the relevance of their research to their professional future and speak to project-specific learning outcomes established with their research instructor and mentor

Audience: Undergraduate

PATH-BIO 699 – DIRECTED STUDY

1-5 credits.

Projects in the laboratory and/or through library work in specific subject area under the direct guidance of faculty member.

Requisites: Consent of instructor

Course Designation: Level - Advanced

L&S Credit - Counts as Liberal Arts and Science credit in L&S

Repeatable for Credit: Yes, unlimited number of completions

Last Taught: Spring 2025

Learning Outcomes: 1. Apply foundational veterinary knowledge and critical thinking to identify problems in veterinary medicine

Audience: Undergraduate

2. Develop professional veterinary medicine skills of interest by performing select techniques and procedures

Audience: Undergraduate

3. Communicate in written and/or verbal reports to veterinary colleagues and supervisors

Audience: Undergraduate

PATH-BIO/M M & I 750 – HOST-PARASITE RELATIONSHIPS IN VERTEBRATE VIRAL DISEASE

3 credits.

Detailed study of the pathogenesis of vertebrate viral disease, stressing viral invasion, dissemination, mechanisms of disease production, immune pathology, persistence, resistance, and transmission.

Requisites: Graduate/professional standing

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2025

Learning Outcomes: 1. Demonstrate understanding of mechanisms involved in pathogenesis of viral infections

Audience: Graduate

2. Obtain experience in critically reading scientific research

Audience: Graduate

3. Enhance scientific presentation skills

Audience: Graduate

4. Design and prepare funding applications for research projects in viral pathogenesis

Audience: Graduate

PATH-BIO 775 – EXTERNSHIP

1-24 credits.

Offers opportunities for faculty coordinated experience in the veterinary medical profession outside School of Veterinary Medicine.

Requisites: Declared in Doctor of Veterinary Medicine with fourth year standing

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: Yes, unlimited number of completions

Last Taught: Spring 2023

Learning Outcomes: 1. Understand real-world applications of foundational veterinary medical knowledge and skills

Audience: Graduate

2. Apply foundational veterinary knowledge and critical thinking to solve real-world problems

Audience: Graduate

3. Perform select techniques and procedures to develop various skills professional in veterinary medicine

Audience: Graduate

PATH-BIO 799 – PRACTICUM IN VETERINARY SCIENCE TEACHING

1-3 credits.

Instructional orientation to teaching at the higher education level in the agricultural and life sciences, direct teaching experience under faculty supervision, experience in testing and evaluation of students, and the analysis of teaching performance.

Requisites: Consent of instructor

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2018

PATH-BIO/COMP BIO 812 – RESEARCH ETHICS AND CAREER DEVELOPMENT

2 credits.

Provides instruction in principles and concepts of research ethics through presentations and discussion of case studies. Topics pertinent to development of a successful career in research are also included.

Requisites: Graduate/professional standing

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: No

Last Taught: Spring 2025

Learning Outcomes: 1. Analyze the complexities of ethical issues in research and the factors that can influence perceptions of ethical behavior.

Audience: Graduate

2. Develop a framework for making ethical decisions in research.

Audience: Graduate

3. Identify areas to apply best practices in responsible conduct of research to guide decision-making.

Audience: Graduate

4. Explain where to seek guidance for improving scientific communication skills.

Audience: Graduate

5. Develop the ability to effectively convey research results and findings.

Audience: Graduate

6. Recognize the importance of ethical conduct in research.

Audience: Graduate

7. Discuss the potential consequences of unethical behavior in research.

Audience: Graduate

8. Develop a sense of personal responsibility for maintaining ethical standards in research.

Audience: Graduate

9. Recognize the importance of safe research environments.

Audience: Graduate

PATH-BIO 930 – ADVANCED SEMINAR

1 credit.

Requisites: Consent of instructor

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: Yes, unlimited number of completions

Last Taught: Spring 2025

Learning Outcomes: 1. Use mind mapping to create a hierarchal structure to contextualize the projects/aims in your thesis research and design an effective scientific presentation.

Audience: Graduate

2. Apply concepts for effective data display and presentation to create and give a clear and well-organized research seminar presentation.

Audience: Graduate

3. Prepare a graphical abstract that effectively communicates the significance, design, and take-home message of your study or proposed work.

Audience: Graduate

4. List 3 best practices for delivering an effective scientific presentation based on your peer evaluations of presentations delivered by classmates this semester.

Audience: Graduate

5. State 3 things that you do not want to do when giving a talk, based on your experience giving a presentation and your observations of the presentations by others.

Audience: Graduate

PATH-BIO 990 – RESEARCH

1-12 credits.

Requisites: Consent of instructor

Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement

Repeatable for Credit: Yes, unlimited number of completions

Last Taught: Spring 2025

Learning Outcomes: 1. Exhibit a broad understanding of general pathobiological science principles

Audience: Graduate

2. Conduct independent research using a variety of approaches

Audience: Graduate

3. Think critically to address research challenges

Audience: Graduate

4. Exhibit and foster professional and ethical conduct in their research

Audience: Graduate

5. Collaborate with other investigators within or outside the thesis lab

Audience: Graduate