Pathobiology and Integrative Biomedical Sciences (PIBS)

PIBS 4787: Historical, Societal and Ethical Topics in Medicine and Biomedical Research
(cross-leveled with PIBS 7787). Advances in medicine, genetics, reproduction and technologies underpinning biomedical research can have profound implications not only scientifically but in terms of societal and ethical impact. Using several historical events such as the establishment of the first immortal cell line, the Tuskegee syphilis study, the eugenics movement in the United States and the cloning of Dolly the sheep as starting points, we will explore the historical, societal and ethical context and issues surrounding these events and relate them to current ethical and moral questions that have been generated by recent scientific and medical progress. Graded on A-F basis only.

Credit Hours: 2
Prerequisites: junior or senior standing
Recommended: Successful completion of a general biology course

PIBS 5011: Veterinary Anatomy
In-depth study of the structure of the horse, ox, sheep, goat, pig and avian species. (Instructional periods 3 and 4). Graded on A-F basis only.

Credit Hours: 3

PIBS 5012: Veterinary Anatomy with Laboratory
Continuation of PIBS 5011. In-depth study of the structure of the horse, ox, sheep, goat, pig and avian species. (Instructional periods 3 and 4). Graded on A-F basis only.

Credit Hours: 3

PIBS 5020: Teratology
A survey of abnormal vertebrate development across organ systems through mechanistic, anatomical, and clinical perspectives. Graded on A-F basis only.

Credit Hours: 0.5
Prerequisites: 1st year Veterinary students

PIBS 5021: Teratology
A survey of abnormal vertebrate development across organ systems through mechanistic, anatomical, and clinical perspectives. Graded on A-F basis only.

Credit Hours: 0.5
Prerequisites: 1st year Veterinary students

PIBS 5051: Veterinary Gastrointestinal Physiology
Continuation of PIBS 5504. Physiology of the gastrointestinal tract, exocrine pancreas and liver. Lecture and lab designed to emphasize principles important to the practice of veterinary medicine. Graded on A-F basis only.

Credit Hours: 2

PIBS 5052: Veterinary Endocrinology and Reproductive Physiology
Continuation of PIBS 5051. Comparative endocrinology and reproductive biology. Graded on A-F basis only.

Credit Hours: 2

PIBS 5100: Veterinary Neuroscience
A laboratory and lecture-based course emphasizing the applied anatomy and physiology of the nervous system of domestic animals. Instructional period 2. Graded on A-F basis only.

Credit Hours: 2

PIBS 5500: Veterinary Anatomy with Laboratory
Correlative study of the anatomy of domestic and laboratory animals in which the developmental and gross anatomy are integrated. A segment is devoted to neuroanatomy. Dissection includes the dog, cat and common laboratory animals. (Instructional periods 1 and 2). Graded on A-F basis only.

Credit Hours: 4

PIBS 5502: Histology and Embryology with Laboratory
An integrated study of vertebrate body plan formation and development and the subsequent form and function of the derived anatomical structures. Graded on A-F basis only.

Credit Hours: 3

PIBS 5503: Histology and Embryology with Laboratory
An integrated study of vertebrate body plan formation and development and the subsequent form and function of the derived anatomical structures. Graded on A-F basis only.

Credit Hour: 1.5

PIBS 5504: Veterinary Physiology
This course is designed to provide an opportunity and motivation for the student to acquire an understanding of the physiological principles on which rational therapy in medical practice is based. Topics include:

Cellular Neurophysiology, Muscle, Cardiovascular, Renal and Respiratory Physiology. The course also encourages the student to apply these principles in solving problems so that it becomes habitual for him or her to think in terms of "mechanisms of action" as he or she approaches a problem in disturbed physiology. Graded on A-F basis only.

Credit Hours: 5

PIBS 5506: Veterinary Molecular and Cellular Biology
A comprehensive course overviewing molecular and biochemical issues of cell function especially as related to medicine and the underlying molecular causes of disease. Graded on A-F basis only.

Credit Hours: 4

PIBS 5507: Veterinary Pharmacology with Laboratory
General principles of pharmacy, pharmacokinetics, and pharmacodynamics, with emphasis on drugs affecting the central and autonomic nervous system, cardiovascular and hematologic systems. Graded on A-F basis only.

Credit Hours: 3

PIBS 5508: Veterinary Pharmacology
Continuation of PIBS 5507. Antiseptics, autocoids, hemostatics and anticoagulants, fluid and electrolytes, reproductive, endocrine, and gastrointestinal drugs. Graded on A-F basis only.

Credit Hours: 2

PIBS 5509: Veterinary Toxicology
Local and various systemic clinical responses of domestic animals to foreign chemicals including metals, pesticides, water-and food-borne agents, biotoxins, industrial and plant toxins. The principles, mechanism(s) of action, diagnosis, prevention and treatment of chemical intoxications are also presented.

Credit Hours: 3

PIBS 5511: Veterinary Immunology
Basic immunology techniques. Topics include innate and adaptive immunity, development of the immune system, induction and expression of the immune response, structure and function of antibodies, antigen-antibody reactions, the major histocompatibility complex, aspects of immunology in disease. Graded on A-F basis only.

Credit Hour: 1.5

PIBS 5512: Veterinary Immunology
Continuation of PIBS 5511. Graded on A-F basis only.

Credit Hour: 1.5

PIBS 5552: Veterinary Bacteriology with Laboratory
Classification and properties of pathogenic bacteria and fungi of animals; relationship to public health; considers pathogenesis, immunology of infection. Instructional period 5. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: enrollment in the College of Veterinary Medicine

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PIBS 5553: Veterinary Bacteriology II
Continuation of PIBS 5552. Instructional period 6. Graded on A-F basis only.

Credit Hours: 2.5

PIBS 5554: Veterinary Virology
Classification and properties of viruses. Considers the etiologic, pathologic and immunologic aspects of viral diseases of animals. Instructional periods 6 and 7. Graded on A-F basis only.

Credit Hours: 2.5
Prerequisites: enrollment in the College of Veterinary Medicine

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PIBS 5555: Epidemiology and Biostatistics with Laboratory
This course introduces students to methods of determining the influence of disease on populations and how this information is applied to individual animals. Biostatictics and evidence based medicine are also discussed in this course. The knowledge gained in this course is applied to reading professional literature during the course. Instructional period 4. Graded on A-F basis only.

Credit Hours: 2

PIBS 5557: Veterinary Parasitology with Laboratory
Parasites and parasitic diseases of ruminants, horses, swine, dogs, cats, poultry and other animals. Includes classification, morphology, and bionomiics of protozoa, helminths, and arthropods. Instructional period 6. Graded on A-F basis only.

Credit Hours: 3

PIBS 5558: Veterinary Public Health
In this course students are introduced to the wide range of veterinary involvement in maintaining and assuring human health, nationally and globally. Topics discussed include: agencies such as USDA, FDA, CDC,

food safety and meat inspection, veterinary responsibility in identifying diseases, legal issues of drug use, and zoonotic diseases. Instructional period 7. Graded on A-F basis only.

Credit Hours: 2

PIBS 5575: Veterinary Pathology with Laboratory
General Pathology. Tissue reactions to various disease agents in domestic animals. Instructional period 5. Graded on A-F basis only.

Credit Hours: 3

PIBS 5576: Veterinary Systemic and Special Pathology with Laboratories
Special and systemic pathology. Tissue reactions to disease in special systems in domestic animals. Instructional period 6. Graded on A-F basis only.

Credit Hours: 3

PIBS 5577: Veterinary Systemic and Special Pathology II with
Follows the general pathology and continues the systemic pathology taught in PIBS 5576. The course, consisting of daily lectures and weekly laboratories, covers disease, mainly in domestic animals, of the following systems or organs: cardiovascular, respiratory, lymphoid, cutaneous, mammary, ophthalmic, and otic. Instructional period 7. Graded on A-F basis only.

Credit Hours: 3

PIBS 5578: Veterinary Clinical Pathology with Laboratory
Physiologic basis, interpretation and clinical application of laboratory assays in hematology, chemistry, cytology, and urinalysis, utilization of laboratory methods to define pathological states and to diagnose disorders of domestic animals. Instructional period 8. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: enrollment in College of Veterinary Medicine

PIBS 5579: Veterinary Genomics
Study of genomes, an organism's entire set of the genetic information. Used for detection of pathogen genomes, and markers for mutation causing inherited disease. Instructional period 5. Graded on A-F basis only.

Credit Hour: 1

PIBS 5601: Animals in Emergencies & Basic Emergency Response Training for Vet Students
This course will enable veterinary and graduate students to understand their role in society during disasters and credential as responders. Graded on A-F basis only.

Credit Hour: 1
Prerequisites: Students must be enrolled in the College of Veterinary Medicine and pursuing a DVM degree or be a student pursuing an MPH degree. Instructor consent required for non-veterinary graduate students seeking MPH degrees

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PIBS 5991: Introduction to Avian Medicine
Introduction to Avian Medicine. Graded on A-F basis only.

Credit Hour: 1

PIBS 5995: Foundations in Veterinary Research and Discovery
This course will introduce veterinary students to concepts of research including hypothesis development, experimental design, data interpretation, grantsmanship, responsible conduct of research, biomedical research careers and presentation and publication methods. Graded on S/U basis only.

Credit Hours: 2

PIBS 6010: Laboratory Animal Medicine
Principles of Veterinary Medicine applied to laboratory animals as pets and in research. Husbandry, handling and clinical techniques, diseases, and use as disease models are discussed. Instructional period 8. Graded on A-F basis only.

Credit Hour: 1.5

PIBS 6647: Pathology and Laboratory Diagnostics
Application of laboratory techniques used to diagnose disease by macroscopic, microscopic, biochemical, microbiologic, serological and toxicologic findings. Case method of teaching. Domestic and avian species. Six times yearly. Graded on A-F basis only.

Credit Hours: 8

PIBS 6676: Laboratory Animal Medicine and Management Elective
Elective offered 3rd- and 4th-year students, subject to approval of course coordinator and supervising faculty. Concentrated study/experience in laboratory animal disease(s)/colony management. Available to veterinarians as a continuing education program. Graded on A-F basis only.

Credit Hour: 2-6

PIBS 6678: Epidemiology and Community Health
Elective covering advanced aspects of epidemiology and community health. Emphasizes problem solving and is designed to meet needs of the individual student. Instructional period arranged. Graded on A-F basis only.

Credit Hour: 2-6
Prerequisites: PIBS 5558 or instructor's consent

PIBS 6679: Diagnostic Pathology and Special Species Medicine
Third- and fourth-year students. Elective. Approval of coordinator and supervisory staff. Continuation of PIBS 6647 with more depth. Available to D.V.M.'s as part of continuing education program. Graded on A-F basis only.

Credit Hour: 2-6

PIBS 6684: Research Techniques in Veterinary Pathobiology
Research Techniques in Veterinary Pathobiology. Graded on A-F basis only.

Credit Hour: 1-6

PIBS 7110: Veterinary Cytology
(cross-leveled with BIOMED 4110, VET_TCH 4110). This course of Veterinary Cytology is designed to hone the skills of the practicing Veterinary Technician, Veterinary Student, or Veterinarian and assumes some basic knowledge of microscope usage and normal hematology. The review of normal cells will be minimal and emphasis will be placed on findings associated with inflammatory and neoplastic diseases. The graduate level course will include discussion of ancillary tests, special stains and treatment alternatives. The focus will be on canine and feline diseases but some common equine and bovine disease.

Credit Hours: 2
Prerequisites: DVM or equivalent degree or instructor's consent

PIBS 7210: Animal Issues in Disasters
(cross-leveled with BIOMED 4210, VET_TCH 4210). Course provides a broad overview of the complex issues that arise when animals are present within a disaster impact area. The course includes information about the legal requirements for animal disaster response, how the existence of the human-animal bond influences human behavior during a disaster, and the common animal welfare and public health issues that arise during disasters. Students will use current information about disaster preparedness at pertinent websites to prepare individual emergency response plans for their families and animals. Additionally, students will complete 5 FEMA certifications associated with disaster response of animals. Finally, students will analyze appropriate literature to improve their preparedness for and response to a future disaster. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: Admittance into MS in Biomedical Sciences, emphasis Veterinary Sciences or emphasis Veterinary Medicine and Surgery, or instructor's consent required

PIBS 7302: Cytology, Histology, and Organology of Domestic Animals I
Detailed study of the structure and function of the cell, basic tissues (epithelium, connective tissue, muscle, nervous tissue) and several organ systems (cardiovascular, lymphatic, integument, digestive, visual, auditory) of domestic mammals and birds.

Credit Hours: 3
Prerequisites: background in biological sciences, instructor's consent

PIBS 7333: Veterinary Cell Biology
(cross-leveled with BIOMED 4333, VET_TCH 4333). Course material stresses cell biology as related to animal health and medical issues. A comprehensive course overviewing molecular and biochemical issues of cell function especially as related to medicine and the underlying molecular causes of disease. Graded on A-F basis only.

Credit Hours: 4
Prerequisites: instructor's consent

PIBS 7600: Host-Associated Microbiomes in Health and Disease
(cross-leveled with MICRO 4600). This course will provide a broad and comprehensive background on host-associated microbial communities such as the gut, dermal, and respiratory microbiotas. Course content will focus primarily, but not completely, on bacterial communities colonizing human and animal hosts, and each week will focus on a different topic within microbiome research. This course will also focus on the physiological role of host-associated microbial communities in health and disease-associated changes in composition and function, rather than the methodology used to characterize these communities or analyze the data. Nonetheless, students will gain a strong familiarity with sequencing platforms, methods, and common outcomes measures during this course. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: Introduction to medical microbiology (e.g., MICROB 3200 or equivalent)

PIBS 7787: Historical, Societal and Ethical Topics in Medicine and Biomedical Research
(cross-leveled with PIBS 4787). Advances in medicine, genetics, reproduction and technologies underpinning biomedical research can have profound implications not only scientifically but in terms of societal and ethical impact. Using several historical events such as the establishment of the first immortal cell line, the Tuskegee syphilis study, the eugenics movement in the United States and the cloning of Dolly the sheep as starting points, we will explore the historical, societal and ethical

context and issues surrounding these events and relate them to current ethical and moral questions that have been generated by recent scientific and medical progress. Graded on A-F basis only.

Credit Hours: 2
Prerequisites: Consent of Instructor

PIBS 8090: Thesis Research in Pathobiology and Integrative Biomedical Sciences
Open to graduate students with requisite preparation. Research on specific animal diseases, prevention and treatment. Graded on a S/U basis only.

Credit Hour: 1-10

PIBS 8100: Veterinary Neuroscience
A laboratory and lecture based course emphasizing the applied anatomy and physiology of the nervous system of domestic animals. Graded on A-F basis only.

Credit Hours: 2
Prerequisites: Restricted to first year veterinary students or graduate students

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PIBS 8200: Multidisciplinary Approaches to Biomedical Sciences
The goal of this course is to aid the student in developing a multidisciplinary philosophy to problem solving in biomedical research. Methods used in molecular, biochemical, cellular, tissue, organ, and whole animal studies will be emphasized.

Credit Hours: 2
Prerequisites: instructor's consent

PIBS 8400: Histopathology Slide Seminar
Each semester Histopathology Seminar is held every Thursday between 9-10am in the Multi-head Microscope Room W114, Veterinary Medicine Building. Histology slides to be discussed are available the previous week in Veterinary Medical Diagnostic Lab (Room D117). Four histopathology cases are selected by the course coordinator (a veterinary anatomic pathologist). Interesting cases from MU Veterinary Medical Diagnostic Laboratory's necropsy/biopsy cases and The Joint Pathology Center (JPC) Wednesday Slide Conference cases (https://www.askjpc.org/wsco/index.php) are used. Veterinary pathology residents/graduate students must read those 4 histology slides and prepare descriptions before each seminar. Graded on S/U only.

Credit Hour: 1
Prerequisites: DVM or equivalent degree

PIBS 8401: Topics in Veterinary Pathobiology
Courses with lectures in various topics in veterinary pathobiology will be given on a trial basis, depending on faculty expertise and student demand. Credit hours are usually 1 or 3. Specialized topics will be covered.

Credit Hour: 1-99
Prerequisites: instructor's consent

PIBS 8402: Evidenced Based Medicine - Application from Literature Review
This course is designed to teach students how to assess best current evidence in their primary area of study and apply it to their ongoing research and to patient-based delivery of care. Students are instructed in all aspects of medical literature review and complete weekly assignments to demonstrate their learning. The assignments and discussions with the instructor(s) include determination of appropriate application of the knowledge gained.

Credit Hours: 3

PIBS 8403: Histopathology of Joint and Disc Degeneration
This course will focus on the degenerative/osteoarthritic changes seen in synovia, menisci, articular cartilage, subchondral bone, ligaments, fat pad, tendon and intervertebral discs in biped and quadruped animals. Scoring systems used to quantify these changes will be reviewed. Cases will be provided and discussed. Laboratories with hands-on dissection of joints and processing of tissues for histology will be offered. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: Instructor's consent

PIBS 8404: Topics - Scientific Writing for Musculoskeletal Research
This course is designed to teach students how to write scientific abstracts, manuscripts, and grants in order to most effectively and successfully present, disseminate, and apply their research in the musculoskeletal field. Students are instructed in all aspects of scientific writing and complete weekly assignments to demonstrate their learning. The assignments and discussions with the instructor(s) include determination of appropriate application of the knowledge gained. Graded on A-F basis only.

Credit Hours: 3

PIBS 8420: Veterinary Physiology
This course is designed to provide an opportunity and motivation for the student to acquire an understanding of the physiological principles on which rational therapy in medical practice is based. Topics include: Cellular Neurophysiology, Muscle, Cardiovascular, Renal and Respiratory Physiology. The course also encourages the student to apply these principles in solving problems so that it becomes habitual for him or her

to think in terms of "mechanisms of action" as he or she approaches a problem in disturbed physiology.

Credit Hours: 5
Prerequisites: BIOCHM 4270 and BIOCHM 4272

PIBS 8421: Veterinary Physiology
Continuation of PIBS 8420. Physiology of the gastrointestinal tract, exocrine pancreas, liver, endocrine system and reproduction.

Credit Hours: 4

PIBS 8431: Research Methods and Data Analysis
Specific assignments on diagnostic methods including surgical pathology, necropsies, toxicology.

Credit Hour: 2-4
Prerequisites: departmental consent

PIBS 8432: Advanced Histopathology
Advanced microscopic study of pathological tissues.

Credit Hours: 5
Prerequisites: departmental consent

PIBS 8434: Advanced Clinical Pathology
Lecture/tutorial teaching; pathogenesis of clinical laboratory abnormalities in the common domesticated species. Emphasis is placed on mechanisms of disease and pathophysiology of the changes seen in each organ system.

Credit Hours: 3
Prerequisites: departmental consent

PIBS 8435: Advanced Microscopy in Veterinary Clinical Pathology
Recognition and pathogenesis of abnormalities found via microscopic analysis of blood smears or cytology.

Credit Hour: 1
Prerequisites: PIBS 5578 and departmental consent; DVM or current enrollment in veterinary curriculum

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PIBS 8436: Pathogenic Mechanisms in Veterinary Pathobiology
This course is designed to prepare veterinary clinical and anatomic pathology residents for Phase I of the certifying board exam. There will be extensive reading from the relevant portions of Robbins and Cotran's Pathologic Basis of Disease, plus links to current general pathology review papers and occasional reference to Zachary's Pathologic Basis of Veterinary Disease. Assignments will focus on preparation of boards-style multiple choice questions, with the opportunity to review and critique your classmates' questions.

Credit Hours: 3
Prerequisites: DVM degree, instructor consent
Recommended: Current enrollment within a veterinary clinical or anatomic pathology residency

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PIBS 8439: Gross and Microscopic Pathology Examination and Interpretation
Specific assignments on gross and microscopic pathology examination including necropsies and surgical biopsies and their interpretation along with or without ancillary test results including cytology examination, CBC/ Blood chemistry, bacterial culture, PCR testing, serology testing, fecal testing, and/or toxicology testing.

Credit Hour: 2-4
Prerequisites: Departmental consent

PIBS 8440: Pathology Journal Review
Critical review of the current veterinary pathology literature with a focus on ACVP board preparation. Grade on S/U basis only.

Credit Hour: 1
Prerequisites: DVM degree

PIBS 8441: Topics in Veterinary Pathobiology
Subjects appropriate to veterinary pathobiology and/or epidemiology, taught on a one-time basis or infrequently. May include highly specialized topics. Specific course must be approved by departmental faculty.

Credit Hour: 1-3

PIBS 8445: Vectors and Vector-borne Diseases
This course will focus on arthropod vectors (insects and ticks) and the medically important pathogens / diseases that they transmit, including arboviruses, bacteria, protozoa and nematodes. An emphasis will be on the interactions between the vectors and disease-causing pathogens. Topics include: introductions to systematics, anatomy, physiology, life cycles, and ecology of vectors and classification and biology of the pathogens responsible for such diseases as dengue, yellow fever, malaria, leishmaniasis, lymphatic filariasis, etc. The focus will be not only on specific pathogen-vector interactions but also on big picture topics / discussions of vector competence, insecticide resistance, vector control (including genetically modified insects) and other current issues in vector biology research. Students will learn how these important vector-borne diseases are transmitted, how they are spread and introduced into new regions, and what control strategies exist or are currently under development. Students will realize what impact vector-borne diseases have on global human and animal health as well as develop and hone critical thinking skills.

Credit Hours: 3
Prerequisites: Graduate standing in the Life Sciences

PIBS 8448: Molecular Methods in Nucleic Acids
The course will focus on the most recent developments in technology related to eukaryotic and prokaryotic molecular biology and as analysis a manipulation of nucleic acids and their application to define structure, function and biosynthesis of macromolecules.

Credit Hours: 3
Prerequisites: instructor's consent

PIBS 8450: Non-Thesis Research in Veterinary Pathobiology
Research not expected to terminate in dissertation.

Credit Hour: 1-99

PIBS 8451: Introduction to Immunology
Fundaments of immunology as applied to domestic animals.

Credit Hours: 3

PIBS 8452: Cell and Molecular Electron Microscopy
Lecture class that describes the use of electron microscopy (transmission and scanning) in biomedical research. Students receive hands-on experience by completing a laboratory project.

Credit Hours: 4

PIBS 8454: Domestic Animal Virology
Classification and properties of viruses. Considers the etiologic, pathologic and immunologic aspects of viral diseases of animals. Instructional periods 6.

Credit Hours: 2.5

PIBS 8455: Epidemiology and Biostatistics
Graduate level introduction to veterinary epidemiology and bio-statistics.

Credit Hour: 2-3

PIBS 8457: Animal Parasitology

Credit Hour: 3-5

PIBS 8458: Veterinary Public Health
In this course students are introduced to the wide range of veterinary involvement in maintaining and assuring human health, nationally and globally.

Credit Hours: 2

PIBS 8509: Veterinary Toxicology
Local and various systemic clinical responses of domestic animals to foreign chemicals including metals, pesticides, water-and food-borne agents, biotoxins, industrial and plant toxins. The principles, mechanism(s) of action, diagnosis, prevention and treatment of chemical intoxications are also presented. Graded A-F only.

Credit Hours: 3

PIBS 8552: Veterinary Pathogenic Bacteriology and Mycology I
This course deals with the bacterial pathogens of animals emphasizing the pathogenesis and pathology of the diseases, diagnostic problems, appropriate treatments and prevention measures. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: instructor's consent

PIBS 8553: Veterinary Pathogenic Bacteriology and Mycology II
This course deals with the bacterial pathogens of animals emphasizing the pathogenesis and pathology of the diseases, diagnostic procedures, appropriate treatments and prevention measures. Graded on A-F basis only.

Credit Hours: 2.5
Prerequisites: PIBS 5552 or PIBS 8552 and instructor's consent

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PIBS 8555: Advanced Techniques of High-Containment Microbiology Operations and Research
Designed to provide a basic understanding of microbiological research conducted in high-containment microbiology laboratories at the graduate level. Special emphasis will be placed on topics in microbiological research of major medical/veterinary infectious diseases of high consequence throughout the world. Because these infectious diseases cause significant morbidity and mortality worldwide and have zoonotic potential, they must be handled with special precautions in biosafety level three facilities. The focus of lectures will be on the biology and epidemiology of paradigm diseases and on the special procedures, facilities and equipment used to conduct infectious disease research. A separate 1-hour laboratory course is offered and highly encouraged but not required. Graded on A-F basis only.

Credit Hours: 3

Prerequisites: Enrollment in a graduate level Life Science or Master of Public Health program at MU. Bachelor's degree in microbiology or Biological Sciences or instructor consent required

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PIBS 8601: Animals in Emergencies & Basic Emergency Response Training for Vet Students
This course will enable veterinary and graduate students to understand their role in society during disasters and credential as responders. Graded on A-F basis only.

Credit Hour: 1
Prerequisites: Students must be enrolled in the College of Veterinary Medicine and pursuing a DVM degree or be a student pursuing an MPH degree. Instructor consent required for non-veterinary graduate students seeking MPH degrees

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PIBS 8641: Introduction to Research Ethics
This course provides students with a brief overview of many of the ethical issues that confront today's scientist. It is important that scientist think about and develop their abilities to make well-reasoned responses to ethical problems.

Credit Hour: 1

PIBS 9085: Teaching Practicum
Learning experience designed to develop and enhance teaching skills under the supervision of teaching mentors. May be taken more than once. Graded on S/U basis only.

Credit Hour: 1-6
Prerequisites: Instructor's consent

PIBS 9090: Dissertation Research in Pathobiology and Integrative Biomedical Sciences
Dissertation Research for PhD students. May be repeated for credit. Graded on S/U basis only.

Credit Hour: 1-10
Prerequisites: departmental consent

PIBS 9425: Microvascular Physiology
(same as MPP 9434). An in-depth study of microcirculatory structure and function in various organs with emphasis on understanding the mechanisms involved in the regulation of local blood flow, nutrient supply, lymphatic function, and tissue fluid balance.

Credit Hours: 4
Prerequisites: PIBS 8420 and PIBS 8421 or equivalent and instructor's consent

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PIBS 9462: Hormone Action
(same as BIOCHM 9462). A lecture course with weekly assigned readings. Topics will include: a description of selected polypeptide, steroid and other hormones and their biological effects; receptors; second messengers; protein phosphorylation in hormone mediation; growth factors; cellular oncogenes.

Credit Hours: 2
Prerequisites: BIOCHM 7272

PIBS 9467: Neural Cardiorespiratory Control
Course objectives include developing a general understanding of CNS mechanisms in the regulation of the cardiovascular and respiratory system, including autonomic, neurohumoral and body fluid homeostatic mechanisms, gaining knowledge of the major advances and topics in the field and becoming familiar with some of the methods used to study CNS cardiorespiratory regulation. Graded on A-F basis only.

Credit Hours: 3
Prerequisites: instructor's consent