<table>
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<tr>
<th>Course Title And Related Pillar</th>
<th>Course General Objectives</th>
<th>Fall Credits</th>
<th>Spring Credits</th>
<th>Total Credits</th>
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<tr>
<td>ACBS 464A/564A PHYSICAL SCIENCES FOR ONE HEALTH (Fall)</td>
<td>• Have a working knowledge of the principles of physics that underlie the mechanics of locomotion, flow dynamics (including anesthetics), thermodynamics, optics, electrophysiology and applied radiation in the context of biological systems.&lt;br&gt;• Understand the foundations of biochemistry and the biochemical mechanisms that underlie metabolism (carbohydrate, lipid and protein utilization), homeostasis and acid base and common causes of metabolic diseases.&lt;br&gt;• Understand the chemical mechanisms that underlie maintenance of biological fluids&lt;br&gt;• Have foundational knowledge of DNA, RNA and proteins in phenotypes and their selection.&lt;br&gt;• Apply physics and chemistry to understand the basis of health including immunology and vaccines&lt;br&gt;• Have an introductory knowledge of pharmaceutical agents and toxins and their interaction with biochemical pathways to effect physiological processes.&lt;br&gt;• Demonstrate knowledge of experimental models for health research</td>
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<td>ACBS 466/566 PRINCIPLES OF DISEASE (ONE HEALTH)</td>
<td>• Understand the fundamentals of pathology and pathogenesis of infectious and non-infectious diseases, both acute and chronic.&lt;br&gt;• Have introductory knowledge of the classes of infectious agents (bacterial, viral, prions, parasites, and vectors) with emphasis on zoonotic agents&lt;br&gt;• Have introductory knowledge of non-infectious causes of disease (genetic, toxins, and physical).&lt;br&gt;• Know principles of therapeutics and their application to health promotion and disease prevention and treatment.&lt;br&gt;• Have foundational knowledge of genomics in health research and evolution.&lt;br&gt;• Understand foundational principles of diagnostic testing in clinical cases.</td>
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<td>ACBS 470/570 INTERACTIONS OF ANIMALS, HUMANS AND ECOSYSTEMS (ONE HEALTH)</td>
<td>• Have basic and conceptual knowledge of comparative nutrition and its role in health and disease.&lt;br&gt;• Demonstrate fundamental understanding of the interactions between diet, micro, and macro environment and health.&lt;br&gt;• Understand the basic science of plants, their environment and nutritional value that affect animal, public and ecosystem health.&lt;br&gt;• Analyze policies and programs promoting plant and animal-based food safety and global food security.&lt;br&gt;• Demonstrate a working knowledge of the principles of One Health.</td>
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Know the basic principles of epidemiology and apply them to public and animal health disease outbreaks, such as zoonotic, vector-borne, emerging, and food-borne causes.
- Analyze how government policies and programs impact the delivery of health systems for animals and people.
- Critically analyze the root causes of disease and apply knowledge of biosciences to disease prevention.
- Understand the role of animals as they relate to ecosystem health such as environmental resources and the management of those resources (i.e. rangeland, ecosystem restoration, conservation vs. preservation, native lands, etc.)

**ACBS 467/567 COMPUTATION IN BIOMEDICINE**
*(ONE HEALTH & COMMERCE)*

- Apply basic principles of the relationship between biostatistics, experimental design and analysis to critically evaluate and understand the scientific literature.
- Utilize the principles of non-parametric statistical and experimental design to critically review scientific articles for their applicability to clinical, real-life scenarios and evidence-based medicine.
- Apply knowledge of statistics and computational modeling to understand how food safety risk assessments form the scientific underpinnings of international food standards and trading and are used to mitigate health risks through risk management and communication.
- Have knowledge of computational technologies: current state and future of information technology in promoting animal-public-ecosystem health.

**ACBS 468A/568A BIOECONOMY, MARKETING AND BUSINESS (Fall)**

**ACBS 468BA/568B BIOECONOMY, MARKETING AND BUSINESS (Spring)**
*(COMMERCE)*

- Demonstrate an understanding of small business and corporate structure and operations including negotiations, contract and basic accounting, using veterinary practices, pet industry, veterinary pharmaceutical companies and agribusiness as examples.
- Demonstrate knowledge of fundamental business law and regulations as it pertains to the above industries (Practice acts, State and National laws, etc.).
- Demonstrate knowledge of business risk management and risk communication tools.
- Understand the fundamental principles of business ethics as it pertains to the above industries and professional expectations.
- Have knowledge of perfecting liens via UCC filings and Deeds of Trust.
- Have knowledge of basic HR law and protected categories.
- Have introductory knowledge of entrepreneurship and business development.
- Have an understanding of communication skills applicable to clients (education, customer service), employees (interviewing, team building, and managing personnel interactions), investors, and media for the above industries.
- Understand concepts common to both Macro & Microeconomics
  - Understand Macroeconomics Key Concepts:
  - Aggregate Demand and Supply,
  - Monetary and Fiscal Policy
| **ACBS 469A/569A**  
**ETHOLOGY, EVOLUTION, ETHICS AND ANIMAL HANDLING (Fall)** | **ACBS 469BA/569B**  
**ETHOLOGY, EVOLUTION, ETHICS AND ANIMAL HANDLING (Spring)**  
**(HUMAN-ANIMAL INTERDEPENDENCE)** |
| --- | --- |
| - World Trade: tariffs, area of origin labeling, exotic disease designations.  
  - Have knowledge of the concepts involved in selling to markets  
  - Be able to demonstrate how social, environmental and economic sustainability principles of commerce apply to health and health delivery systems locally and globally  
  - Understand the evolution of trade and demonstrate knowledge of the role animals and animal products have played in the past and are playing in today’s global trade issues.  
  - Discuss the role of animals in the bioeconomy.  
| - Learn the principles of ethology as it relates to development of informed animal handling techniques, interpretation of behaviors, and pain recognition.  
  - Comprehend the role of animals in the evolution of civilization, society, religion, and culture and apply this knowledge in a culturally sensitive, ethical, equitable, community-engaged approach.  
  - Understand the role of humans in the evolution and domestication of non-human animals and the influence of humans on animal genomes.  
  - Understand the effect of animals as food in the evolution of human cognition and physical development.  
  - Demonstrate an understanding of the basic anatomy of the primary body systems of one domestic vertebrate species, its evolution and major functions  
  - Provide examples where the anatomy and physiology of the brain (neurophysiology) interacts with basic learning in certain domestic species.  
  - Understand the basics of cognition and its relationship to nutrition  
  - Understand the basic principles of learning theory and use that knowledge to discuss and solve a variety of behavioral issues involving multiple species.  
  - Describe foundational concepts of normal and abnormal behavioral development in the species studied.  
  - Use knowledge learned regarding physiology, anatomy, cognition, nutrition and animal behavior of a variety of species to understand appropriate species-specific handling, husbandry and enrichment, interpretation of behaviors and medical and behavioral management for optimal outcomes.  
  - Understand how the perception of animal roles varies by culture, including rural versus urban, economics, religion, geography, ecosystems, policies and politics and describe how these impact animal behavior and handling in various worldwide settings.  
  - Compare and contrast the behavior of humans and non-human primates.  
  - Demonstrate an understanding of animal rights versus animal welfare  
  - Understand the role of zoos, aquaria, wildlife parks and conservation in education, species preservation and entertainment. | 3  
| 3  
| 6 |
- Understand the role of shelters and animal control in public health and education.
- Have an introductory understanding of the humane education movement.
- Have an understanding of quality end-of-life services and hospice care for pets.
- Demonstrate knowledge of euthanasia methods and the laws and ethics governing euthanasia and disposal.
- Have an understanding and be able to discuss current national and international animal welfare topics.
- Understand pertinent animal welfare laws and their relationship to biomedical research using case studies.
- Understand the concepts of quality of life and ethical care and use.
- Understand animal loss and its effects on owners in a variety of situations (elderly, children, childless couples, empty nesters, homeless, government-mandated slaughter, natural disasters, disease outbreak).
- Demonstrate knowledge of compassion fatigue and how to prevent/manage symptoms.
- Understand the role animals play in human health and wellbeing (mental, physical and emotional) and the impact on the health and well-being of the animals themselves
  - Pets
  - Service animals (therapy, assistance, search and rescue, disease detection)
  - Military and police animals, APHIS
  - Recreation such as hunting, bird watching
  - Food safety, security and nutrition

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<th>ACBS 471/571 RISK ASSESSMENT, MANAGEMENT AND COMMUNICATION (ALL 3 PILLARS)</th>
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<td>- Apply computational biostatistics to global food safety, security and defense case studies.</td>
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<td>- Understand how risk assessments are used to establish national and international policies, regulations and guidelines that impact global food trade.</td>
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<td>- Be able to differentiate various risk management processes (regulatory and non-regulatory)</td>
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<td>- Analyze scenarios where governments use various risk management tools and international bodies are influenced by politics and science.</td>
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<td>- Use written skills to develop risk communication messages for various audiences.</td>
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<td>- Understand the importance of risk communication during crisis management and be able to recognize various crisis communication tools.</td>
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**Total 10 Courses** | 15 | 15 | 30 |