BIO-1420: ANATOMY & PHYSIOLOGY OF DOMESTIC ANIMALS II

Cuyahoga Community College

Viewing: BIO-1420: Anatomy & Physiology of Domestic Animals II

Board of Trustees:
2016-05-26

Academic Term:
2016-08-22

Subject Code
BIO - Biology

Course Number:
1420

Title:
Anatomy & Physiology of Domestic Animals II

Catalog Description:
Explores the comparative anatomy and physiology of the canine, feline, equine, bovine, ovine, avian and porcine species. Focuses on lymphatic, digestive, respiratory, urinary and reproductive systems. Immunology, pregnancy, lactation, blood and genetics considered. Laboratory includes preserved and fresh specimens, models, microscopic observations, demonstrations and audio/visual aids.

Credit Hour(s):
3

Lecture Hour(s):
2

Lab Hour(s):
2

Other Hour(s):
0

Requisites

Prerequisite and Corequisite
BIO-1410 Anatomy and Physiology of Domestic Animals I.

I. ACADEMIC CREDIT

Academic Credit According to the Ohio Department of Higher Education, one (1) semester hour of college credit will be awarded for each lecture hour. Students will be expected to work on out-of-class assignments on a regular basis which, over the length of the course, would normally average two hours of out-of-class study for each hour of formal class activity. For laboratory hours, one (1) credit shall be awarded for a minimum of three laboratory hours in a standard week for which little or no out-of-class study is required since three hours will be in the lab (i.e. Laboratory 03 hours). Whereas, one (1) credit shall be awarded for a minimum of two laboratory hours in a standard week, if supplemented by out-of-class assignments which would normally average one hour of out-of-class study preparing for or following up the laboratory experience (i.e. Laboratory 02 hours). Credit is also awarded for other hours such as directed practice, practicum, cooperative work experience, and field experience. The number of hours required to receive credit is listed under Other Hours on the syllabus. The number of credit hours for lecture, lab and other hours are listed at the beginning of the syllabus. Make sure you can prioritize your time accordingly. Proper planning, prioritization and dedication will enhance your success in this course.

The standard expectation for an online course is that you will spend 3 hours per week for each credit hour.
II. ACCESSIBILITY STATEMENT

If you need any special course adaptations or accommodations because of a documented disability, please notify your instructor within a reasonable length of time, preferably the first week of the term with formal notice of that need (i.e. an official letter from the Student Accessibility Services (SAS) office). Accommodations will not be made retroactively.

For specific information pertaining to ADA accommodation, please contact your campus SAS office or visit online at http://www.tri-c.edu/accessprograms/. Blackboard accessibility information is available at http://access.blackboard.com.

III. ATTENDANCE TRACKING

Regular class attendance is expected. Tri-C is required by law to verify the enrollment of students who participate in federal Title IV student aid programs and/or who receive educational benefits through other funding sources. Eligibility for federal student financial aid is based in part on enrollment status.

Students who do not attend classes for the entire term are required to withdraw from the course(s). Additionally, who withdraw from a course or stop attending class without officially withdrawing may be required to return all or a portion of their financial aid based on the date of last attendance. Students who do not attend the full session are responsible for withdrawing from the course(s).

Tri-C is responsible for identifying students who have not attended a course before financial aid funds can be applied to students’ accounts.

Therefore, attendance is recorded in the following ways:

• For in-person and blended-learning courses, students are required to attend the course by the 15th day of the semester (or equivalent for terms shorter than five weeks) to be considered attending. Students who have not met all attendance requirements for in-person and blended courses, as described herein, within the first two weeks or equivalent, will be considered not attending.

• For online courses, students are required to login at least two times per week and submit one assignment per week for the first two weeks of the semester, or equivalent to the 15th day of the term. Students who have not met all attendance requirements for online courses, as described herein, within the first two weeks or equivalent, will be considered not attending.

At the conclusion of the first two weeks of a semester or equivalent, instructors report any registered students who have “Never Attended” a course. Those students will be administratively withdrawn from that course. However, after the time period in the previous paragraphs, if a student stops attending a class or wants or needs to withdraw, for any reason, it is the student’s responsibility to take action to withdraw from the course. Students must complete and submit the appropriate Tri-C form by the established withdrawal deadline.

Tri-C is responsible to ensure that students receive financial aid only for courses that they attend and complete. Students reported for not attending at least one of their registered courses will have all financial aid funds held until confirmation of attendance in registered courses has been verified. Students who fail to complete at least one course may be required to repay all or a portion of their federal financial aid funds and may be ineligible to receive future federal financial aid awards. Students who withdraw from classes prior to completing more than 60 percent of their enrolled class time may be subject to the required federal refund policy.

If illness or emergency should necessitate a brief absence from class, students should confer with instructors upon their return. Students having problems with coursework due to a prolonged absence should confer with the instructor or a counselor.

IV. LEARNING OUTCOMES ASSESSMENT

Occasionally, in addition to submitting assignments to their instructors for evaluation and a grade, students will also be asked to submit completed assignments, called ‘artifacts,’ for assessment of course and program outcomes and the College’s Essential Learning Outcomes (ELOs). The artifacts will be submitted in Blackboard or a similar technology. The level of mastery of the outcome demonstrated by the artifact DOES NOT affect the student’s grade or academic record in any way. However, some instructors require that students submit their artifact before receiving their final grade. Some artifacts will be randomly selected for assessment, which will help determine improvements and support needed to further student success. If you have any questions, please feel free to speak with your instructor or contact the Learning Outcomes Assessment office.

V. CONCEALED CARRY STATEMENT

College policy prohibits the possession of weapons on college property by students, faculty and staff, unless specifically approved in advance as a job-related requirement (i.e., Tri-C campus police officers) or, in accordance with Ohio law, secured in a parked vehicle in a designated parking area only by an individual in possession of a valid conceal carry permit.

As a Tri-C student, your behavior on campus must comply with the student code of conduct which is available on page 29 within the Tri-C student handbook, available athttp://www.tri-c.edu/student-resources/documents/studenthandbook.pdfYou must also comply with the College’s Zero Tolerance for Violence on College Property available athttp://www.tri-c.edu/policies-and-procedures/documents/3354-1-20-10-zero-tolerance-for-violence-policy.pdf
Outcomes

Course Outcome(s):
Apply the fundamental knowledge of the digestive system of the canine, feline, equine, bovine, ovine, avian and porcine species when working in biomedical research, veterinary medicine, animal agriculture or other advanced scientific study.

Objective(s):
1. Explain the importance of microbes to digestion in the ruminants and equids.
2. Describe and identify the structural differences in the digestive tract between monogastrics and ruminants.
3. Identify the rumen compartments with their differing appearances and describe their individual functions.
4. Identify the regions of the monogastric digestive tract and explain their functions.
5. Describe the chemicals and compounds involved in the digestive process, including acids, enzymes, mucus and buffers.
6. Describe the digestive tract of a bird and explain the function of the various structures, including the differences from the digestive tract of a monogastric mammal.

Course Outcome(s):
Apply the fundamental knowledge of the lymphatic system and blood composition of the canine, feline, equine, bovine, ovine, avian and porcine species when working in biomedical research, veterinary medicine, animal agriculture or other advanced scientific study.

Objective(s):
1. Identify the major blood cells and describe their functions.
2. Identify the major components of the blood and describe the difference between serum and plasma.
3. Describe the structure and function of lymphatic tissue.
4. Describe the gross anatomy of lymphatic vessels and their organization.
5. Explain the formation and function of lymph.

Course Outcome(s):
Apply the fundamental knowledge of the respiratory system of the canine, feline, equine, bovine, ovine, and porcine species when working in biomedical research, veterinary medicine, animal agriculture or other advanced scientific study.

Objective(s):
1. Recognize the general anatomic features of the mammalian respiratory system.
2. Describe the mechanics of ventilation, including negative and positive pressure.
3. Explain the control mechanisms for normal ventilation.
4. Describe the physiology of internal and external respiration.
5. Explain the principles of partial pressures, gas transport, blood gases, and acid/base balance.

Course Outcome(s):
Apply the fundamental knowledge of the urinary system of the canine, feline, equine, bovine, ovine, and porcine species when working in biomedical research, veterinary medicine, animal agriculture or other advanced scientific study.

Objective(s):
1. Identify gross and microscopic anatomy of the mammalian urinary system.
2. Explain the physiology of filtration, absorption, secretion, and renal thresholds.
3. Describe the role of the kidneys in pH and electrolyte balance, fluid balance, and nitrogen balance.
4. Describe the mechanisms of micturition.

Course Outcome(s):
Apply the fundamental knowledge of the reproductive system and lactation in the canine, feline, equine, bovine, ovine, avian and porcine species (as applicable) when working in biomedical research, veterinary medicine, animal agriculture or other advanced scientific study.

Objective(s):
1. Describe the microscopic anatomy of the testes.
2. Recognize the gross anatomical and functional aspects of the various components of the male reproductive system, including circulation, innervation, and the clinical significance of species variations.
3. Explain the mechanisms of erection, intromission, and ejaculation, the components of semen, species variations, and clinical applications.
4. Describe the anatomical and functional aspects of the various components of the female reproductive system and relate this to clinical applications.
5. Recognize the microscopic anatomy of the ovary and relate this to clinical applications.
6. Describe the components and processes of spermatogenesis, including hormonal control, and chromosome numbers for various species, and relate this to important clinical applications.
7. Describe the components and processes of fertilization, oogenesis, including hormonal control, chromosome numbers, and estrous cycles for various species.
8. Describe the different types of placentation.
9. Describe normal parturition including the hormonal triggers for parturition, milk letdown, and milk production.
10. Describe the process of egg formation and laying in birds.
11. Identify the structures of the avian reproductive tract and explain the function of the cloaca.

Course Outcome(s):
Apply the fundamental knowledge of genetics and immunology in the canine, feline, equine, bovine, ovine, and porcine species when working in biomedical research, veterinary medicine, animal agriculture or other advanced scientific study.

Objective(s):
1. Recognize dominant, codominant, incomplete dominant, and recessive inheritance patterns and be able to give examples of each from various species.
2. Describe X-linked and sex-influenced inheritance.
3. Recognize various inherited genetic traits within various species.
4. Explain the difference between specific and non-specific immunity.
5. Explain the role of B cells and T cells in immunologic reactions.
6. Describe the process of antibody production and how this relates to vaccination.
7. Describe passive and active immunity and relate this to important clinical applications.
8. Explain the importance of colostrum to the immune function of neonates.

Methods of Evaluation:
1. Objective lecture examinations
2. Practical laboratory examinations
3. Quizzes
4. Participation
5. Journal article summary

Course Content Outline:
1. Lymphatics
   a. Lymph
   b. Lymph vessels
      i. Capillaries
      ii. Thoracic duct
   c. Lymph organs
   d. Nodes
   e. Spleen
   f. Thymus
2. Immunity
   a. Non-specific immunity
      i. Complement cascade
      ii. Inflammation
   b. Specific immunity
      i. B Cells
      ii. Antibody protection
      iii. Memory B cells
      iv. T cells
      v. Helper T cells
      vi. Cytotoxic T cells
   c. Passive vs. Active transfer
      i. Colostrum
      ii. Vaccination
3. Digestive system
   a. Mechanical vs. chemical digestion
   b. Monogastric digestion
i. Horse vs. carnivore/omnivore

ii. Anatomy
   1. Stomach
   2. Small intestine
   3. Cecum
   4. Large intestine

iii. Physiology of absorption
   1. Small intestine vs. large intestine

iv. Role of cecum in hindgut fermenters

c. Ruminant digestion
i. Anatomy
   1. Reticulum
      a. Esophageal groove
   2. Rumen
   3. Omasum
   4. Abomasum
   5. Small intestine
   6. Large intestine

ii. Physiology
   1. pH and chemical composition of each compartment
   2. Function of each compartment

iii. Role of microbes
   1. VFA as energy source

iv. Nutritional principles
   1. Carnivores
   2. Herbivores
   3. Omnivores

4. Respiratory system
   a. Organs of respiration
   b. Gross anatomy
      i. Nares
      ii. Pharynx
      iii. Larynx
      iv. Trachea
   v. Lungs
      1. Bronchi
      2. Bronchioles
      3. Alveoli
   c. Microscopic anatomy
   d. Physiology of ventilation
   e. Mechanics of ventilation
      i. Muscular movement
      ii. Role of diaphragm
   f. Negative vs. positive pressure ventilation
   g. Control of ventilation
      i. Neurogenic and muscular
   h. Physiology of gas exchange
      i. External respiration
      ii. Internal respiration
      iii. Partial pressures
      iv. Transport of respiratory gases
         1. Oxygen
         2. Carbon dioxide
      v. Acid/base balance

5. Urinary System
   a. Organs of the urinary system and gross anatomy
      i. Kidneys
      ii. Ureters
iii. Bladder
iv. Urethra

b. Microscopic anatomy
i. Nephron
ii. Collecting duct
iii. Ureter
iv. Urinary bladder

c. Physiology of the urinary system
i. Filtration
ii. Absorption
iii. Secretion
iv. Renal thresholds
v. Homeostatic mechanism
vi. pH
vii. Electrolytes
viii. Fluid balance
ix. Nitrogen balance
x. Micturition

6. Male reproductive system
a. Anatomy
i. Glans penis
ii. Penis
   1. Erectile tissue
   2. Os penis
iii. Prepuce
iv. Urethra
v. Bulbourethral glands
vi. Prostate gland
vii. Seminal vesicles
viii. Vas deferens
ix. Inguinal rings
x. Epididymis
xi. Testes
xii. Scrotum
xiii. Cryptorchidism

b. Microscopic anatomy of the testes
i. Seminiferous tubules
ii. Interstitial cells
iii. Sertoli cells

c. Hormonal influences

d. Physiology of ejaculation
i. Stimulation
ii. Erection
iii. Ejaculation
iv. Seminal fluid

7. Female reproductive system
a. Anatomy
i. Vulva
ii. Vestibule
iii. Hymen
iv. Clitoris
v. Labia
vi. Vagina
vii. Accessory glands
viii. Cervix
ix. Uterine body
x. Uterine horns
xi. Oviduct
xii. Fimbria
xiii. Ovary
xiv. Broad ligament
xv. Round ligament
xvi. Vascular supply

b. Microscopic anatomy
   i. Germ cells
   ii. Developing follicles
   iii. Graafian follicles
   iv. Corpus luteum
   v. Corpus albicans

c. Hormonal influences
   i. Estrogen
   ii. Progesterone
   iii. FSH
   iv. LH

d. Estrous cycle
   i. Proestrus
   ii. Estrus
   iii. Metestrus
   iv. Diestrus
   v. Anestrus

e. Avian reproductive tract
   i. Structure and function
   ii. Egg formation

f. Pregnancy
   i. Embryonic membranes
   ii. Placenta
   iii. Gestation
   iv. Parturition
   v. Lactation

g. Anatomy of the mammary gland
   i. Hormonal control of milk production and letdown

8. Genetics
   a. Overview of molecular genetics
   b. Dominant/recessive patterns of inheritance
   c. X-linked inheritance
   d. Multiple alleles
   e. Incomplete dominance
   f. Codominance
   g. Sex-influenced inheritance

9. Blood
   a. Components
      i. Liquid
      ii. Protein
         1. Albumin
         2. Fibrinogen/fibrin
   b. Cells/cellular components
      i. Red blood cells
      ii. White blood cells
         1. Lymphocyte
         2. Monocyte
         3. Eosinophil
         4. Basophil
         5. Neutrophil
      iii. Platelets
   c. Plasma vs. serum
   d. Antigen/antibody reactions
   e. Clotting mechanisms
i. Conversion of fibrinogen to fibrin  
ii. Role of platelets  
iii. Clotting factors

**Resources**


