

LAGUARDIA COMMUNITY COLLEGE
CITY UNIVERSITY OF NEW YORK

DEPARTMENT OF NATURAL SCIENCES

VERTEBRATE ANATOMY AND PHYSIOLOGY II
SCB 209

COURSE INFORMATION

SPRING I 2015

3 credits, 4 hours: 2 lecture and 2 lab

Course Coordinator: Dr. Boris Zakharov

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Section 620

Instructor: Dr. Boris Zakharov

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Office Hours: Monday 3:30-5:30 p.m.

Lecture Text (required):

Clinical Anatomy and Physiology for Veterinary Technicians. Thomas Colville, Joanna M. Bassett. Mosby Elsevier Publishing, 2008 (Second Edition). ISBN: 978-0-323-04685-5.

Lecture Outline		
Week	Topic:	Assigned Reading:
1	The nervous system	Ch. 13, 315-323.
2	Brain; cranial nerves; spinal cord	Ch. 13, 324-328.
3	Autonomic nervous system and Reflexes	Ch. 13, 328 – 336
4	Senses and sense organs	Ch. 14, 337-342.
5	Special senses	Ch. 14, 342-357.
6	Digestive system	Ch. 11, 264-282
7	Midterm (weeks 1-6)	
8	The respiratory system	Ch. 10, 247-263
9	Cardiovascular system	Ch. 8, 205-219.
10	Blood, lymph, and immunity	Ch. 9, 220-246.
11	Urinary system	Ch. 16, 374-386.
12	Reproduction	Ch. 17, 387-404, Ch. 18, 405-413.
13	Final Exam (weeks 7-12)	

Laboratory Text (required):

Comparative Anatomy, Manual of Vertebrate Dissection. Second Edition,
Dale W. Fishbeck, Aurora Sebastiani. Morton Publishing Company, 2008.

ISBN 10: 0-89582-748-4

ISBN 13: 978-0-89582-748-7.

Laboratory Outline		
Week	Topic:	Assigned Reading:
1	Peripheral nervous system, central nervous system, spinal cord	Ch. 12, 84-85; Ch. 40, 419-424.
2	Brain and cranial nerves	Ch. 12, 79-84; 86-88; Ch. 40, 411-418.
3	Special senses	Ch. 12, 89-94; Ch. 40, 424-429.
4	Quiz 1 (week 1-3) Digestive system	Ch. 8, 57-60; Ch. 37, 355- 365.
5	The respiratory system	Ch. 37, 364-369.
6	Midterm (weeks 1-5)	
7	The heart.	Ch. 39, 381-387.
8	The great Blood Vessels.	Ch. 39, 388-410.
9	Circulation continued	Ch. 11, 69-78.
10	Quiz 2 (week 7-9) Excretory system	Ch.9, 61-63; Ch. 38, 371- 380.
11	Reproductive system Review	Ch. 10, 65-68; Ch. 38, 371-380.
12	Laboratory Final (weeks 7-11)	

Note: please bring laboratory text to all lab classes

GRADING CRITERIA

- Attendance is **mandatory** for both the lecture and the laboratory. Any absences must be verified by a doctor's note.
- A student who misses an exam without a valid, documented excuse will receive a zero for that exam.
- More than two latenesses will result in a five-point deduction from the exam following the infraction.

Lecture:

There will be three announced quizzes, two before the midterm and one after the midterm. The lowest quiz grade will be dropped. There will be a midterm and a final. The final is not cumulative.

Laboratory:

Note that there is a strict **no food, no drink, no smoking and no open toed shoe policy** in the laboratory. Students who fail to comply with these rules may not participate in the laboratory.

There will be two announced written quizzes, one before the midterm and one after the midterm. The lower grade will be dropped. There will be a practical midterm and a practical final exam. The final will not be cumulative.

Calculation of Course Grade

Lecture (50%)

Quizzes	10%
Midterm exam	20%
Final Exam	20%

Laboratory (45%)

Quizzes	5%
Midterm exam	20%
Final Exam	20%

Class Participation	<u>5%</u>
	100%

Final Grades

92.5-100 = A 86.5-89.4 = B+ 76.5-79.4 = C+ 66.5-69.4 = D+ 0-59.4 = F
89.5-92.4=A- 82.5-86.4 = B 72.5-76.4 = C 62.5-66.4 = D
79.5-82.4 = B- 69.5-72.4 = C- 59.5-62.4 = D-

CHEATING POLICY

Anyone caught cheating at any time receives a zero for that exam. The student may refer to the school policy on academic integrity for further information.

COURSE CONDUCT

Cell phones and beepers are to be turned **off** during class. If there is an extreme emergency, please inform the instructor at the beginning of class, and set the instrument to vibrate. Texting during class is prohibited.

DO NOT ARRIVE LATE!!

It is rude to your classmates and disruptive to the class for students to arrive late. Lateness will affect your course grade.

The student is strongly encouraged to keep up with the lecture and laboratory material, as there is a large volume of information to assimilate. You are urged to seek assistance if and as soon as you feel that you are having difficulty, rather than waiting until examination dates are imminent.

The professor's office hours will be announced in class; other appointments can be made if needed.

Comparative Anatomy and Physiology II – SCB 209

Course Objectives

Lecture 1

- Describe the structure and functions of neurons and neuroglia
- White matter and gray matter
- Afferent and efferent neurons
- Structural organization of the nervous system
- Describe the process of depolarization and repolarization
- Synapse and neurotransmitters
- Refractory period and salutatory conduction

Lecture 2

- Meninges
- Define and locate the cerebral ventricles
- Cerebrospinal fluid
- Name the cerebral hemispheres and describe their location
- Describe the major functions of the cerebral cortex
- Describe the location and function of the thalamus and hypothalamus
- Brain stem and Cerebellum
- List the cranial nerves in terms of number and function
- Spinal cord

Lecture 3

- The difference between autonomic and somatic nervous systems
- Difference between sympathetic and parasympathetic divisions
- Reflexes
- Difference between autonomic and somatic reflexes
- Components of the reflex arch
- Describe the stretch reflex, withdrawal reflex, crossed extensor reflex

Lecture 4

- Describe types of senses and receptors
- Proprioceptors
- List and describe the visceral senses
- Superficial and central thermoreceptors
- Nociceptors

Lecture 5

- Describe the types of olfactory receptors involved in the sense of smell, and describe their function.
- Describe the histologic appearance of the tongue, and how this relates to the sense of taste
- List and locate the accessory structures of the eye
- Compare the primary structural components of the ocular globe in terms of location and function
- Describe the functions of the lens and the retina
- Define these terms relative to vision: refraction, accommodation, transduction, adaptation, visual field
- Compare the functions of the outer, middle and inner ear
- Describe the functions of the ossicles, and the components of the organ of Corti; contrast mammalian with avian/reptilian structure and function
- Organs of the static and dynamic equilibrium

Lecture 6

- List the major functions of the digestive tract, and relate each to its structural component
- Describe the boundaries of the peritoneal cavity, and define “mesentery”
- Compare the structure of the carnivore’s oral cavity and esophagus to that of the ruminant
- Discuss the secretions and motility of the monogastric stomach
- Discuss the secretions and motility of the ruminant stomach
- Discuss the secretions and digestive functions of the small and large intestines in the carnivore
- Describe the exocrine functions of the pancreas
- Explain the digestive functions of the liver and its related structures, including a definition of portal circulation
- Contrast the structure of the equine colon with that of the caprine (goat) colon

Lecture 7

Midterm exam

Lecture 8

- Describe the major functions of the respiratory system

- Describe the anatomy of the conducting pathway of the respiratory system
- Explain the concepts of respiration and ventilation
- Discuss the importance of surface tension in alveolar function, and how animals decrease airway resistance
- Define “tidal volume” and “minute volume” in regard to respiration
- Explain the importance of “dead space” in maintaining respiratory function
- Describe issues of gas transport, particularly as they relate to hemoglobin
- Explain the role of neural control of respiration
- Define chemoreceptors in the mammalian respiratory system
- Compare avian to mammalian respiratory structure and function

Lecture 9

- List and describe the layers of the heart wall
- List the chambers of the heart and describe the path of blood flow
- Describe the structure and locations of the heart valves
- Differentiate between systole and diastole
- Describe the process of depolarization and repolarization of cardiac muscle cells and the pathway of the electrical impulse
- List the events responsible for the heart sounds heard on auscultation
- List the factors that influence heart rate and cardiac output
- Describe relationship between cardiac output, heart rate, and stroke volume
- Describe the structures of arteries, capillaries, and veins
- Pulmonary and systemic circuits, and major blood vessels

Lecture 10

- Composition of blood and its function
- Define erythrocyte, leukocyte, and thrombocyte
- Define hemostasis
- Describe in general terms the blood “clotting cascade”, and how clots form and are destroyed
- Define blood groups, and define “blood typing” and “cross-matching”
- Trace the pathways of blood through the heart
- Describe the steps in the production of a heartbeat

- Differentiate the structure of arteries and veins, and relate it to their function
- Discuss the various systems that contribute to systemic blood pressure levels; define systolic and diastolic pressure
- Define baroreceptor
- Leukocytes and their function
- Lymph and lymphatic system

Lecture 11

- List the major functions of the urinary system
- Describe the functions of the major parts of the nephron
- Define the term “countercurrent mechanism”
- Contrast the concepts of dilute and concentrated urine, and explain how the renal tubules work to produce one or the other
- Explain the endocrine functions of the kidney
- Describe the effect of aldosterone on renal function
- Compare the structure of the urethra in the dog and the cat, as it relates to urethral obstruction
- Contrast avian excretion with mammalian excretion

Lecture 12

- Explain the difference between menstrual and estrous cycles
- Describe the hormonal control of the estrous cycle in the cat and dog, as it relates to ovulation, the corpus luteum, fertilization, pregnancy, and parturition
- Discuss the development of the ovum
- Discuss the development of sperm cells
- Discuss methods of fertilization such as embryo transfer and cloning
- Discuss the relationship of the structure to the function of the mammary glands
- Contrast mammary glands in carnivores, equines, and rodents, in terms of number and location of teats
- Define colostrum
- Explain the relationship between lactation and nutrition in ruminants

Vetebrate Anatomy and Physiology II - SCB 209

Laboratory Guidelines

Laboratory I

Specimen:

Spinal cord models

Nerve models

Brain models

Cat

Slides of spinal cord and peripheral nerves

Identify the following:

White matter and gray matter of spinal cord

Dorsal and ventral nerve roots

Peripheral spinal nerves

Axon

Dendrite

Neuron

Spinal cord (on tail of cat)

Optic nerve (cow eye)

On dissection of cat:

Sciatic nerve

General location of radial nerve

View slides

Laboratory II

Cat model

Sheep brains

Brain models

Dissect sheep brain and identify:

Cortex and medulla

Dura matter

Ventricle

Pons

Cerebellum

Arbor vitae

Frontal, parietal, and occipital lobes

Pituitary/hypothalamus

Gray matter and white matter

Brainstem

Identify the same on the brain model

On the cat, be able to identify the following cranial nerves:

I

II

VII

VIII

X

Laboratory III

Specimen:

Model of ear

Model of eye

Model of brain

Cow eyes

Identify:

Ear:

Tympanic membrane

Pinna

Ossicles

Semicircular canals

Cochlea

Organ of Corti/hair cells

Eye:

Cornea

Sclera

Nictitating membrane

CN VIII

Iris

Pupil

Tapetum lucidum

Retina

Optic disk

Cranial nerves 1, 2

Laboratory IV

Quiz (week 1-3)

Cat

Model of ruminant GI tract
Preserved avian (GI tract)

Locate in the cat:

Esophagus
Fundus, body, and pyloric antrum of stomach
Duodenum/jejunum
Cecum
Ascending and descending colon
Pancreas
Omentum
Mesentery
Gall bladder
Quadrate and caudate lobes of liver

On the model of the ruminant GI tract:

Rumen. Reticulum. Omasum. Abomasum. Spiral colon

Locate crop, gizzard and cloaca on bird specimen

Laboratory V

Specimen:

Cats

Identify in the cat:

Trachea, tracheal rings. Mediastinum. Main bronchi
Right, medial, and caudal lobes of lung on each side. Accessory lobe of lung
Serosal and parietal pleura

Review for midterm exam

Laboratory VI

Midterm Exam

Laboratory VII

Specimen:

Cat

Model of heart

Identify:

Pericardium

Ventricles

Atria
Auricles
Base and Apex of heart
Atrioventricular valves (know the common names of each)
Semilunar valves (aortic and pulmonic)
Chorda Tendinae
Coronary Arteries and Veins
Pulmonary artery
Pulmonary vein
Aorta (ascending, descending), aortic arch
Ascending and descending vena cava
Papillary muscles

Laboratory VIII and IX

Specimen:

Cat
Fixed model of cat
Heart model

Veins:

Azygous
Brachiocephalic
Subclavian
Cephalic
External jugular
Internal jugular
Saphenous
Hepatic
Renal
Common iliac
Femoral

Arteries:

Right and left subclavian arteries. Brachicephalic artery. Common carotid arteries.
Celiac trunk. Renal. Adrenolumbar. Femoral artery. Mesenteric arteries. Hepatic.
Abdominal aorta. Brachial

Lymphatic:

Thoracic duct

Laboratory X

Quiz 2 (weeks 7-9)

Specimen:

Cat

Model of kidney

Model of urinary bladder

Slides of glomerulus

Kidney. Pelvis. Papilla. Capsule. Cortex. Medulla. Hilus. Nephron (on model), including glomerulus and collecting duct

Ureters

Urinary bladder, including trigone

Urethra

Penis

Vulva

Laboratory XI

Specimen:

Cat

Models of human reproductive tracts

Ovaries. Oviduct. Uterine horns, uterus. Vulva. Glance penis, prepuce. Scrotum. Median groove of scrotum. Testis. Epididymis. Spermatic cord. Broad ligament. Cloaca

Endocrine system:

Thyroid gland, parathyroid gland, adrenal gland

Review for final

Laboratory XII

Final exam