ANATOMY (ANAT)

ANAT 5050 Structural Adaptations to Function
Veterinary gross anatomy course. The basic principles of mammalian and avian anatomy are studied in a veterinary context. The laboratory periods are given to the dissection of the dog, cat, horse, various ruminants, various laboratory animals, chicken and fish. Prerequisite: Permission of instructor in Veterinary School
Fall
2 Course Units

ANAT 5120 Human Anatomy: Cardiovascular, Respiratory, Digestive, and Musculoskeletal Systems
This human anatomy course will cover anatomy, embryology, histology, and imaging of the: cardiovascular system; respiratory system; digestive system; and musculoskeletal system, including the limbs, vertebral column, and back. This course is open to LPS Post-Baccaulaureate students only. Please contact Kimberly Halscheid (battilo@upenn.edu) if you have question. Cardiovascular and Respiratory Systems. The objectives are to: 1) define and discuss the structures that participate in the process of respiration; 2) compare and contrast structures situated in the chest (thorax and mediastinum); 3) describe anatomic differences of the right versus the left lung, structures in each lung, and how each lung functions; 4) summarize the anatomic differences in the atria and ventricles of the heart and how these chambers contract, resulting in the opening and closing of the atrioventricular and semilunar valves; 5) compare and contrast the histology of the heart, bronchi, bronchioles, and lung alveoli; 6) analyze and identify anatomic structures in plain films and/or other imaging modalities; and 7) discuss the embryology of the heart and lungs, including fetal and postnatal circulation and common congenital heart malformations.
0.5 Course Units

ANAT 5130 Human Anatomy: Cardiovascular and Respiratory Systems
This 0.5 CU human anatomy course will cover anatomy, embryology, histology, and imaging of the cardiovascular and respiratory systems. The objectives are to: 1) define and discuss the structures that participate in the process of respiration; 2) compare and contrast structures situated in the chest (thorax and mediastinum); 3) describe anatomic differences of the right versus the left lung, structures in each lung, and how each lung functions; 4) summarize the anatomic differences in the atria and ventricles of the heart and how these chambers contract, resulting in the opening and closing of the atrioventricular and semilunar valves; 5) compare and contrast the histology of the heart, bronchi, bronchioles, and lung alveoli; 6) analyze and identify anatomic structures in plain films and/or other imaging modalities; and 7) discuss the embryology of the heart and lungs, including fetal and postnatal circulation and common congenital heart malformations. This course is open to LPS Post-Baccaulaureate students only. Please contact Kimberly Halscheid (battillo@upenn.edu) if you have questions.
0.5 Course Units

ANAT 5140 Human Anatomy: Digestive System
This 0.5 CU human anatomy course will cover anatomy, embryology, histology, and imaging of the digestive system. The objectives are to: 1) define the embryological basis for the formation of the gastrointestinal tract; 2) define and discuss the anatomic structures that make up the digestive system, including the mouth, larynx, esophagus, stomach, small intestine, large intestine, liver, and biliary tract; 3) compare and contrast the arterial blood supply and the functional and histologic differences in various parts of the gastrointestinal tract; and 4) analyze and identify anatomic structures in plain films and/or other imaging modalities. This course is open to LPS Post-Baccaulaureate students only. Please contact Kimberly Halscheid (battillo@upenn.edu) if you have questions.
0.5 Course Units

ANAT 5150 Human Anatomy: Musculoskeletal System
This 1.0 CU human anatomy course will cover anatomy, embryology, histology, and imaging of the musculoskeletal system, including the limbs, vertebral column, and back. The objectives are to: 1) discuss the anatomic structures that make up the major parts of the musculoskeletal system, which are the vertebral column and back, upper limbs, and lower limbs; 2) identify the blood supply, innervation, and musculature of the upper limbs, including the shoulder, elbow, wrist, and hand; 3) identify the blood supply, innervation, and musculature of the lower limbs, including the hip, knee, ankle, and foot; 4) define the components of the nervous system that affect the musculoskeletal system, limbs, vertebral column, and back and discuss nerve lesions; 5) discuss how herniated disks, fractures of the upper and lower limbs, and impingement of nerve roots can result in musculoskeletal abnormalities, and 6) analyze and identify anatomic structures in plain films and/or other imaging modalities. Please contact Kimberly Halscheid (battillo@upenn.edu) if you have questions. Students who have completed ANAT 5120 are NOT eligible for this course.
1 Course Unit

ANAT 5160 Human Anatomy: Endocrine and Reproductive Systems
This 0.5 CU human anatomy course will cover anatomy, embryology, histology, and imaging of the endocrine and reproductive systems. The objectives are to: 1) define mechanisms of hormonal signaling; 2) describe the anatomic relationships and gross structure of major endocrine and reproductive organs, including the hypothalamus, pituitary glands, thyroid gland, parathyroid glands, pancreas, adrenal glands, gonads, breasts, and male and female reproductive systems; 3) characterize the microscopic anatomy of major endocrine and reproductive organs; 5) assess the regulation of major hormonal axes and intuit pathophysiologic effects of hormonal dysregulation; 6) explain the effects of significant hormones on their respective target tissues; 7) trace the embryologic origins of the endocrine and reproductive organs, including the pharyngeal apparatus. This course is open to LPS Post-Baccaulaureate students only. Please contact Kimberly Halscheid (battillo@upenn.edu) if you have questions.
0.5 Course Units

ANAT 5170 Anatomy of the Head and Neck: Cranial Nerves and Their Distribution
This 0.5 CU human anatomy course will cover anatomy, embryology, histology, and imaging of the head and neck with emphasis on the cranial nerves and their distribution. The objectives are to: 1) identify major bone and cartilage components of the neck and skull and how they develop; 2) describe sources of innervation to face, CN V and VII; 3) name cranial nerve innervations of extraocular muscles of the eyes; 4) name major elements that make up naso-, oro-, and laryngeal pharynx; 5) name the cranial nerves involved in swallowing; 6) identify the signs and symptoms of lesions of each of the cranial nerves; and 7) identify structures on CT and plain film imaging of head and neck. This course is open to LPS Post-Baccaulaureate students only. Please contact Kimberly Halscheid (battilo@upenn.edu) if you have questions. This course is open to LPS Post-Baccaulaureate students only. Please contact Kimberly Halscheid (battillo@upenn.edu) if you have questions.
0.5 Course Units

ANAT 5180 Brain and Spinal Cord: Longitudinal Neural Pathways
This course, covering the anatomy, development, and cytology of the central nervous system, including a detailed examination of the functional and clinical neuroanatomy of the spinal cord, prepares students to: - Compare and contrast the differences in how the neural tube and neural crest develop, and list their postnatal derivatives. - Compare the malformations that result in open versus closed neural tube defects, including the ability to distinguish the different forms of spina bifida. - List the major excitatory and inhibitory neurotransmitters used by neurons in the central and peripheral nervous system. - Compare the functions of Schwann cells and Oligodendrocytes in forming myelin and the differences in autoimmune diseases (MS and Guillain Barre) associated with each. - Recall the basic anatomy of the spinal cord including the vertebral level where the cord end and meninges end, what makes up the conus medullaris and cauda equina, and which cord segments innervate the upper and lower limbs. - Contrast the two divisions of the ANS in terms of locations of pre and post ganglionic neuron cell bodies, neurotransmitters utilized and receptors that they bind to. - Describe the names and locations of the two neurons that generate voluntary versus reflex contractions of skeletal muscle, and be able to draw and label a cord section with these neurons. - Recall the differences between the myotatic and inverse myotatic reflexes. - Describe how these two sensory systems utilize three neurons to process sensory information. - Draw out the three neurons that are components of the DC/ML System and label the modalities of their dorsal roots, their course and sites of termination. - Draw out the three neurons that are components of the Anterolateral System and label the modalities of their dorsal roots, their course and sites of termination. - Summarize the major signs and symptoms of the 7 common spinal cord diseases and clinical conditions including Polio, Tabes dorsalis, ALS, Subacute Combined Degeneration, Syringomyelia, Anterior cord syndrome, Brown Sequard Syndrome
1 Course Unit

ANAT 5190 Brain and Spinal Cord: Motor and Sensory Functional Systems
This course, covering the anatomy of the central nervous system, including a detailed examination of the functional and clinical neuroanatomy of the brainstem, cerebellum, diencephalon, visual system, auditory system and cerebral cortex, prepares students to: - Describe the cerebellar connectional anatomy that permits the right side of the cerebellum to promote fine-tuning of skeletal muscles on the right side of the body. - Recall how cerebellar lesions cause tremor with movement and how hemisphere lesions of the cerebellum differ from vermis lesions. - Identify which lesions result in dysmetria, disdiadochokinesis, and gait ataxia. - Describe the major components of the Direct and Indirect Basal Ganglia Pathways, the neurotransmitters that they use and their roles in initiating movement or suppressing unwanted movement. - Contrast the signs and symptoms of those with a direct (Parkinson's) and indirect (Huntington's) basal ganglia disease and how each causes different forms of resting tremors. - Name the 4 major tracts that traverse the brainstem and the signs and symptoms if each is lesioned. - Discuss how motor and sensory nuclei of brainstem cranial nerves are organized into functional longitudinal columns in the brainstem and note how this organization correlates with the entry and exit points of cranial nerves. - Distinguish the gaze malfunctions that result from lesions to the Frontal Eye Field, PPRF, and MLF. - Trace the path of a visual stimulus from the nasal and temporal parts of the retina to the cuneus and temporal gyrus of visual cortex. - Draw out the different visual field deficits and the causes evident in lesions to the optic nerve, optic chiasm, optic tract, optic radiations and visual cortex. - Describe the three components of the ear and how the organ of Corti transduces mechanical energy into generator potentials. - Distinguish between the lesion sites and causes of a sensorineural versus a conductive hearing loss and how one uses the Weber and Rinne tests to determine the nature of the hearing loss. - Differentiate the major nuclei of the thalamus and their functions. - Describe the different embryonic origins of the pituitary and the nuclei in the hypothalamus that control or contribute to the functional activity of each pituitary component. - Name the lobes that make up the cortex and distinguish the vascular territories of the anterior, middle and posterior cerebral arteries. - Describe how the dominant hemisphere differs functionally from the non dominant hemisphere. - List four different lesion sites in the dominant hemisphere that result in an aphasia and list the signs and symptoms of that aphasia. -
1 Course Unit