ANP 1106C Human Anatomy & Physiology II

Communication and Movement – the Anatomy and Physiology of the Integumentary, Musculoskeletal and Nervous Systems

Syllabus: Winter 2020

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Course Description:

This is the second of three ANP courses offered by the faculty of medicine. The objective is to provide knowledge of the anatomy of the integumentary and musculoskeletal systems and knowledge of both the anatomy and the physiology of the nervous system. Graduates of this course will have acquired knowledge of: (1) the microscopic structure of skin and bone, selected bone names and their landmarks, and the structure of joints, (2) the names of muscles responsible for a wide range of body movements, and, (3) the anatomy of the nervous system as well as the mechanisms by which the nervous system processes sensory information, generates movements, and, briefly, how it participates in higher mental functions such as memory and thought. This is a 3-credit course (3 lecture hr/week during the term).

Professor: Frank Feiner, Ph.D., M.D. ffeiner@uottawa.ca. Office: Roger Guindon Hall, 451 Smyth Rd (RGN3141), by appointment. I will also be available for 30-60 min after the lecture outside the classroom on Tuesdays, if need be.

Textbook: E.N. Marieb & K Hoehn: Human Anatomy & Physiology (11th edition, 2019); You need the book & the ***access code*** for Mastering A&P - packaged with the book - in order to be able to do the Mastering A&P assignments. If you purchased either book and code for ANP1105/7 you may still use one or both.

Website: On Brightspace.

Lectures:	Tuesdays	1:00 PM – 2:20 PM	100 Louis Pasteur (CRX) C240
	Thursdays	11:30 AM – 12:50 PM	100 Louis Pasteur (CRX) C240

Course Material:

Lecture slides will be posted to Virtual Campus/Brightspace generally 1-2 days prior to each meeting. *Read these and try to fill in the slide* ▭*s that hide certain terms prior to attending lectures. This will help focus on key material and add a lot to what you take out of each lecture.* ▭ *s will be* ***temporarily*** *uncovered during the lectures, but the full-text slides are never circulated. See Taking Notes in Class Based on the Lecture Slides in* Brightspace*.*

Please note that last minute updates to the notes may occur just before the lecture. If you wish to print the notes, you should do so no earlier than 1 day prior to the lecture. You are strongly encouraged to review the lecture notes and/or the relevant pages in the text before coming to class.

Evaluation*:*

There will be three exams as well as online assignments throughout the duration of the course, as indicated in the detailed outline. Exams will be of multiple choice format, some with diagrams. The exam questions will ONLY include the material covered in the lectures, thus the lectures are the best indicator of the depth and breadth of topics for which exam questions will be developed. The topics covered on each exam and their relative values are listed below. Note that the final exam will be cumulative but that only **15%** of the exam will be composed of the same material covered in the first two midterm exams. The remaining 8% of the grade will be from online assignments on the Mastering A & P website throughout the term (*see below for schedule*). You must purchase an access code to be able to do the assignments. The due date for assignments are final and no extensions will be granted under any circumstance so please pay careful attention to the deadline.

Your grade will be based entirely on the exams and Mastering A & P assignments and it is never possible to obtain extra credit, *eg* from additional assignments and/or exams. However, supplemental exams are offered for students who obtain an overall grade of E (*see details below*). The distribution of marks is final and it is not possible to change the weight of the exams or assignments.

GRADING POLICY: For all regularly scheduled exams, student performance is evaluated statistically and any questions deemed unsuitable are either dropped or credited to ensure that exam results accurately reflect student knowledge and understanding. **For makeup exams, however all question will be counted, since it is not possible to make statistical adjustments as with the regularly scheduled exams due to the small numbers of students involved.**

Grading Scheme:

EXAM	DATE	% of Final Mark
Exam 1 (Topics 1 – 3)	Thursday, Jan 30th	25% final mark
Exam 2 (Topics 4 – 6)	Tuesday, Mar 3rd	25% final mark
Mastering A&P Online Assignments	Throughout the term	8% final mark
Final Exam (Topic 7 & review questions)	Date to be Determined	42% final mark
Total		**100 %**

What to do if you miss an exam?

Please read carefully the University rules on justification of absence from an examination.

If you have to miss an exam due to illness, you must obtain documentation from your doctor or the U of O Health Services, as soon as medically possible before or after the exam, for permission to write a deferred exam. The MD note must include 1. the start date of illness, 2. the return to studies date, and 3. the medical consultation date. If you obtain the MD note after the exam, it must certify that you were ill on the exam date. Notes missing any of this information will NOT be accepted. For the final exam, the MD note must come from the U of O Health Services. Please email a scanned copy of the medical note to Dr. Feiner within 5 working days.

For those with valid medical documentation, the deferred makeup exam for the first midterm will be written during Reading Week (Feb 16-22), the deferred exam for the second midterm will be written approximately 7-10 days after the scheduled midterm and the deferred final exam will be written in June. Dates and times will be posted. Note that since multiple courses write on these deferred exam dates, these cannot be changed. If you do not write the regular or the deferred exam, you will obtain a zero for that section of the course.

Supplemental exams are available for those students who fail an ANP course but do well enough to obtain an E. (*See UO Grade Chart*) Students who fail with an F are not eligible for a supplemental exam and must repeat the course. The grade obtained on the supplemental exam replaces the final examination grade in the course. Only the grade obtained after the supplemental exam appears on the student's transcript and is used in the calculation of averages. However, a note on the transcript will indicate that this grade was obtained as a result of a supplemental exam. The regulations regarding illness on exam day indicated in the preceding paragraph also apply to supplemental exam. If you want to write a supplemental exam and are eligible, you must register through the undergraduate studies office of your faculty. Some supplemental examination fees apply. If you register for the supplemental and don't write the exam without informing your faculty of your justified absence at least one day in advance, you will receive the grade "INC" which is equivalent to a failure.

Please examine key deadlines and Ottawa University regulations on minimum grades required and on academic fraud.

The Student Academic Success Service (SASS) website is a great resource when looking for all the services available to students. Mentors are available for ANP courses. For additional information about the mentoring program email mentors@mail.health.uOttawa.ca. *There are several opportunities for help before an exam – talk to Dr. Feiner – but none pertaining to that exam after it!*

Lecture Schedule

Tuesdays 1:00 – 2:20 PM Thursdays 11:30 AM – 12:20 PM	**Topic**	**Value**
Jan 7	1. Course Introduction. Anatomical Terms	
Jan 7, 9, 14, 16, 21	2. Anatomy of the Skeletal System	
Jan 21, 23	3. Anatomy & Physiology of the Joints	
Jan 28	4A. Anatomy of the Muscular System I	
Thursday, Jan 30th	**Exam 1 (Topics 1, 2, 3)**	**25% of final Mark**
Feb 4, 6	4B. Anatomy of the Muscular System II	
Feb 11, 13, [READING WEEK FEB 16-22], 25	5. Anatomy of the Nervous System	
Feb 27	6. Integumentary System	
Tuesday, Mar 3rd	**Exam 2 (Topics 4, 5 & 6)**	**25% of final Mark**
March 5	7.1 Fundamentals Of Nervous System and Nervous Tissue (Review)	
March 10,12	7.2 The Peripheral Nervous System and Reflex Activity	
March 17	7.3 The Autonomic Nervous System	
March 19, 24, 26, 31	7.4 The Special Senses	
April 2	7.5 The Central Nervous System II	
Date to be Determined	**Final exam (Topic 7 [90%] & 1-6 [10%])**	**42 % of final mark**

Mastering A&P Assignment Schedule All due dates final: **penalty 2% for each hour late**

Assignment	**Available - posted after lecture**	**Due Date - at 11:59 PM**
1. Anatomical Terms	Jan 7	Jan 13
2A. Bone & Tissue	Jan 14	Jan 22
2B. Bones and Joints	Jan 23	Jan 27
3A. Muscles I	Jan 28	Feb 5
3B. Muscles II	Feb 6	Feb 12
4A. Neuroanatomy I	Feb 13	Feb 24
4B. Neuroanatomy II	Feb 25	Feb 29
5. Integumentary System	Feb 27	Mar 2
6. Nervous System Review	Mar 5	Mar 11
7. Peripheral Nervous System	Mar 12	Mar 18
8. Autonomic Nervous System	Mar 17	Mar 23
9A. Special Senses I	Mar 24	Mar 30
9B. Special Senses II	Mar 31	Apr 6
10. Central Nervous System	Apr 2	Apr 6

*All assignments are available as study aids until the end of the final exam period. Note that there is also an **introductory assignment** that is available to everyone but really needs to be done only by those new to Mastering. It does not count toward your final Mastering score*

nb *Dates may change slightly depending on progress during the lectures or if the Mastering A&P Access Codes are not available at the bookstore- Let Dr. Feiner know asap if you encounter this latter problem.*

Specific Lecture Topics and Objectives

1. **Anatomical terms** *(Jan 7)*
   - 1.1 Define the anatomical position, the regional and the directional terms, as well as planes and sections
   - 1.2 Describe the body cavities

2. **Anatomy of the Skeletal System** *(Jan 7, 9, 14, 16, 21)*
   - 2.1 Compare the structure of bony tissues and cartilages
   - 2.2 Describe the microscopic structures of bones
   - 2.3 Describe bone formation and remodeling, and explain the factors that affect them
   - 2.4 Anatomy of the skeleton:
     - *2.4.1 Axial skeleton*
       - Skull:
         - Identify and describe the cranial and facial bones
         - Describe the sutures and paranasal sinuses
       - Vertebral column:
         - Identify the regions of the vertebral column
         - Describe the ligaments and intervertebral discs associated with the vertebral column
         - Describe the general structure of vertebrae and compare their regional differences
         - Describe the structure of the sacrum and coccyx.
       - Thorax:
         - Describe the anatomy of the sternum and ribs
     - *2.4.2 Appendicular skeleton*
       - Pectoral girdle: describe the structure of the scapula and clavicle
       - Upper limb: identify the bones of the upper limb and their principal markings
       - Pelvic girdle
         - Identify the bones of the pelvic girdle and their principal markings
         - Distinguish between false and true pelvis; compare the structural differences between male and female pelvis
       - Lower limb: identify the bones of the lower limb and their principal markings

3. **Anatomy and Physiology of the Joints** *(Jan 21, 23)*
   - 3.1 Describe the structural and functional classification of joints
   - 3.2 Describe the structure of synovial joints, bursae and tendon sheaths
   - 3.3 Describe the types of movements that can occur at synovial joints
   - 3.4 Describe the structures and movements of: shoulder, elbow, hip, knee

4. **Anatomy of the Muscular System** *(Jan 28* ***MT1 Jan 30*** *Feb 4, 6)*
   - 4.1 Describe the structural organization of skeletal muscles together with their membranes and tendons or aponeuroses
   - 4.2 Define: agonist, antagonist, synergist, fixator; origin, insertion; explain the general nomenclature of skeletal muscles
   - 4.3 Describe the muscles of facial expression
   - 4.4 Describe the muscles that move the eyeballs, the mandible and the tongue
   - 4.5 Describe the muscles of the neck
   - 4.6 Describe the muscles that move the vertebral column
   - 4.7 Describe the respiratory muscles
   - 4.8 Describe the muscles of the pelvic floor and perineum
   - 4.9 Describe the muscles that move the pectoral girdle
   - 4.10 Describe the compartments and muscles of the arm and forearm
   - 4.11 Describe the intrinsic muscles of the hand
   - 4.12 Describe the muscles that move the thigh
   - 4.13 Describe the compartments and muscles of the thigh and leg
   - 4.14 Describe the intrinsic muscles of the foot.

5. Anatomy of the Nervous System *(Feb 11, 13,* **[READING WEEK FEB 16-22]***,25)*

5.1 Introduction

Histology of nervous tissue
Function and organization of nervous system
Neuroglia
Structure of neurons. Compare nucleus and ganglion

5.2 Central nervous system

Structure of the adult brain
Compare gray and white matter
Cerebral hemispheres
Describe the lobes, gyri and sulci of the cerebral hemispheres
Describe the location and functions of the motor, sensory, and association areas
Explain hemispheric lateralization
Basal nuclei and limbic system: describe their locations and functions
Cerebral white matter: describe the structures and their functions
Diencephalon
Describe the structures and functions of the thalamus, hypothalamus and epithalamus
Brainstem
Describe the structures and functions of the midbrain, pons and medulla oblongata
Explain the role of the reticular formation
Cerebellum
Describe the main structures of the cerebellum; localize the cerebellar peduncles
Spinal cord
Describe the external and internal anatomy of the spinal cord
Describe how the spinal nerves are connected to the spinal cord
Tissues and fluids surrounding the CNS
Describe how the brain and spinal cord are protected
Describe the blood-brain barrier

5.3 Peripheral nervous system

Describe the structure of a nerve
Cranial nerves:
Identify the 12 pairs of cranial nerves by name, number and type
Give the functions and origin of each.
Spinal nerves:
Describe the rami that emerge from a spinal nerve
Define plexus and identify the principal plexuses
Describe the origin and distribution of the cervical plexus
Describe the origin and distribution of the brachial plexus
Describe the origin and distribution of the lumbar plexus
Describe the origin and distribution of the sacral plexus
Define dermatome

6. Integumentary system *(Feb 27)* ***MT2 Mar 3***

6.1 Describe the layers of the epidermis and the cells that compose them
6.2 Describe the layers of the dermis
6.3 Describe the accessory structures of the skin
6.4 Explain the major functions of the skin

7. Nervous System Physiology (*Mar 5**,** 10, 12, 17, 19, 24, 26, 31. Apr 2*)

7.1 Fundamentals of nervous system and nervous tissue (*Review)*

7.1.1 Basic principles (nerve impulses and synaptic transmission):
Review resting potential and action potential
Describe the major classes and functions of neurotransmitters

Review the mechanisms of synaptic transmission and graded potentials
Compare the types of neural circuits

7.2 The peripheral nervous system and reflex activity

7.2.1 Sensory Receptors and Sensation
7.2.1.1 General principles of sensory receptors:
Sensory receptors
Explain signal transduction; define receptor potentials, and compare them to synaptic potentials
Explain the concept of adaptation; describe phasic and tonic receptors
Classify sensory receptors according to their structure, location & function
7.2.1.2 Somatic senses
Describe the properties and location of tactile receptors
Describe the properties and location of thermoreceptors
Describe the properties and location of nociceptors; compare somatic and visceral pain; explain
the concept of referred pain
Describe the location and functions of proprioceptors
7.2.1.3 Perception
Distinguish between sensation and perception
Describe and discuss the principal features of perceptions
7.2.2 Motor systems
Discuss the levels of motor control
Describe the direct and indirect pathways of upper motor neurons
Explain the functions of the precommand systems: cerebellum and basal nuclei
Define the motor unit
7.2.3 Reflex activity:
Define reflex and describe the classifications of reflexes
Describe the basic components of a reflex arc
Somatic spinal reflexes:
Describe the functional anatomy of muscle spindles and Golgi tendon organs
Describe the stretch reflex
Describe the Golgi tendon reflex
Describe the withdrawal and cross-extensor reflexes
Discuss spinal cord reflexes that cause muscle spasms

7.3 The autonomic nervous system

7.3.1 Compare the structural and functional differences between the somatic and autonomic nervous
systems
7.3.2 Compare the anatomical and functional differences between the sympathetic and parasympathetic
divisions of the autonomic nervous system
7.3.3 Visceral Reflex Arcs
7.3.4 Describe the neurotransmitters and receptors involved in autonomic responses
7.3.5 Describe the levels of control of the autonomic nervous system

7.4 The special senses

7.4.1 Vision:
Describe the structural components of the eye
Explain the concepts of refraction, accommodation, image formation
Describe the principal refraction abnormalities
Describe the processing of visual signals in the retina
Describe the neural pathway for vision
7.4.2 Taste: describe the gustatory receptors and the neural pathway for taste
7.4.3 Smell: describe the olfactory receptors and the neural pathway for smell

7.4.4 Hearing & Balance:

Describe the anatomy of the three main regions of the ear
Explain sound waves
Describe the structure and function of outer and inner hair cells
Explain the major events involved in hearing
Describe the auditory pathway
Compare static and dynamic equilibrium, and describe the structure and function of receptor organs
for equilibrium
Describe the equilibrium pathways

7.5 The central nervous system/2

7.5.1 Voluntary actions based on higher mental functions:

Locate the cortical areas for abstract planning
Describe the cortical areas responsible for language
Describe the stages of memory, categories of memory, and discuss the processes involved in transfer of information
Explain the electroencephalogram and describe the brain waves
Describe the stages of sleep and discuss their functions
Describe the regions involved in mood and emotions