Human Anatomy and Physiology I / BIO K211

Instructor: Nicola Ricker, Office #C270

Office Hours: Mondays 4-5pm, Tuesdays 2-3pm, Wednesdays 10-10:50am, Thursdays 2-3 pm

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Office phone: 860-215-9474

Required Text(s): (1) ***Fundamentals of Anatomy and Physiology***, Frederic H. Martini, 10th edition, Prentice Hall Publisher.
(2) *Human Anatomy & Physiology I Laboratory Exercises Manual*

Other required materials: Dissecting kit, Non-latex disposable gloves, Lab coat (Landau model 3178) & Safety goggles.

Description of Course:

Catalogue Description: A comprehensive study of the gross anatomical structure and physiology of the human body pertaining to cells, tissues, membranes and the following systems: Integumentary, Skeletal (Articular), Muscular and Nervous. Prerequisite: English 101 and successful completion of Bio 121 and Chemistry 111 or Chemistry 121 with a "C" grade or higher. This is a two semester course, in order to receive knowledge of all of the body's systems the student is obligated to complete both semesters of Human Anatomy & Physiology. (Bio 211-212)

General Course Objectives:

To aid the student in developing an understanding of the life processes.
To aid the student in developing an understanding of the normal structures and functions of the human body.
To provide a useful body of knowledge for biology, nursing, and allied health students.

Class Attendance Policy:

Attendance is expected for all lecture and laboratory sections. Absences are counted from the first meeting of class. More than four consecutive or more than six accumulative absences could result in student receiving an "F" grade in this course. An explanation of the cause of all absences should be given to your instructor.

Academic and Classroom Misconduct:

The instructor has primary responsibility for control over classroom and/or laboratory behavior and maintenance of academic integrity, and can request the temporary removal or exclusion from the classroom or laboratory of any student engaged in conduct that violated the general rules and regulations of the institution, or any student engaged in conduct deemed hazardous in the laboratory. Extended or permanent

exclusion from lecture or laboratory activities or further disciplinary action can only be effected through appropriate procedures of the institution.
Plagiarism, cheating on quizzes or tests, or any form of academic dishonesty is strictly prohibited. Students guilty of academic dishonesty directly or indirectly will receive a zero for the exercise or quiz or test and may receive a "F" grade for the course in addition to other possible disciplinary sanctions with may be imposed through the regular institutional procedures. Any student that believes that he or she has been erroneously accused may appeal the case through the appropriated institutional procedure if their grade was affected.

Procedure for Dropping the Course:

Any student who finds it necessary to discontinue this course MUST complete a withdrawal form in the Registrar's Office at the time of the withdrawal. If you can not withdraw in person, you may call the Registrar's Office and provide them with the appropriate information. Verbal withdrawals made to the instructor are not acceptable. Students may withdraw from the course at any time up to the course withdrawal deadline, which is December 8th, 2014. Students who do not withdraw, but stop attending class will be assigned an "F" grade for the course. **Once you withdraw from class you are no longer eligible to take any remaining quizzes or tests.**

Tests and Quizzes:

There will be nine (9) scheduled quizzes (additional pop quizzes may also be given), all quizzes are given during the first ten minutes of class. (No make-ups for quizzes). Three unit tests, four lab practicals and a comprehensive final exam will also be given. Unit tests are scheduled in advance and may be reviewed before the final exam is given.

Grade Determination:

½ of the semester's average, ¼ of the lab grade, ¼ of the score on the comprehensive final exam will determine the final course grade.

EXAMPLE:

(Lecture Average)	-	(.50) (90)	=	45
(Lab Grade)	-	(.25) (92)	=	23
(Final Exam Score)	-	(.25) (96)	=	24
			=	92 (A-)

Lecture Average
The lecture average is obtained by the best seven quiz scores (along with your pretest score) being added together and divided by eight to determine the quiz average. Then each of the Unit Tests will be added to the quiz average and divided by four. The comprehensive final exam consists of two hundred questions x 0.5 points, total possible points of 100.

Lab Average
The lab grade will be determined by averaging the four lab practical scores.

Grade Scale:

94.00 or higher = A
90 – 93 = A-
87 – 89 = B+
84 – 86 = B
80 – 83 = B-
74 – 76 = C
70 – 73 = C-
67 – 69 = D+
64 – 66 = D
60 – 63 = D-
59 or lower = F

There will be NO grading on the normal distribution curve (i.e. No grading on a curve)

Make-up Policy:

Lab work may be made up during free time within a week of the missed assignment, ***if the lab is available***. Quizzes **cannot be made up for any reason and they will not be given early/late**. Unit tests can be made up, but they will made-up **ONLY** at my discretion. Makeup tests will be granted on an individual basis only following a conference with the instructor; where the reason(s) for missing the test must be determined as mitigating circumstances beyond the control of the student such as, illness, death in the family, or change in condition of employment. All make-up tests will be scheduled at my convenience and must be made up within 48 hours of the original test date and time. Only one (1) Unit Test make-up will be allowed.

Revisions to the Syllabus:

Students are responsible for learning all of the objectives and all of the items in the course outline whether they are discussed in lecture and/or laboratory or not. The instructor reserves the right to revise the objectives, topical outline, or academic schedule contained in this syllabus without notice. However, if the revisions affects scheduled unit test a 48 hour notice will be given for the new test date.

Cellular Phone Policy:

Cellular phones are **NOT** allowed to be out (this includes, but is not limited to: on desk/on lap/on floor/on desk next to you) in class or lab. Under no circumstance are phones to be answered in class. When there are extenuating circumstances that require a student to be available by phone, that student must speak to me prior to class, so that together they can arrive at an agreement.

If a cell phone is out at any time during a quiz/test/practical it will be assumed that cheating is occurring and the quiz/test/practical will be handed in with a zero, with no possibility of a make-up and further disciplinary sanctions will be possible.

Digication:

All students are required to maintain an online learning portfolio in Digication that uses the college template. Through this electronic tool students will have the opportunity to monitor their own growth in college-wide learning. The student will keep his/her learning portfolio and may continue to use the Digication account after graduation. A Three Rivers General Education Assessment Team will select and review random works to improve the college experience for all. Student work reviewed for assessment purposes will not include names and all student work will remain private and anonymous for college improvement purposes. Students will have the ability to integrate learning from the classroom, college, and life in general, which will provide additional learning opportunities. If desired, students will have the option to create multiple portfolios.

Course Learning Outcomes (Objectives): Human Anatomy and Physiology I

1. The student will develop "critical thinking skills" and will be able to draw sound scientific conclusions through the analysis if scientific data.
2. The student will demonstrate knowledge of the organization of the body on the cellular, tissue and organ-system levels.
3. The student will demonstrate knowledge of body positions and planes of reference.
4. The student will be able to identify the principle elements that make up the body, give their chemical symbols, and summarize the biological role of each.
5. The student will demonstrate knowledge of the atomic structure and is relationship to the interaction of atoms to form molecules.
6. The student will demonstrate knowledge of ionic, convalent and hydrogen bonding and give examples of each.
7. The student will be able to describe the types of inorganic compounds found in the body and explain their biological role.
8. The student will be able to define pH and be able to identify any given pH as acid, alkaline or neutral; describe how pH changes are minimized by buffers.
9. The student will be able to discuss the major classes of organic molecules found in the human body and explain their biological role.
10. The student will be able to demonstrate knowledge of the cell, its organelles and their functions
11. The student will demonstrate knowledge of the various mechanisms of passive and active transport relative to the plasmic membrane.
12. The student will demonstrate knowledge of somatic cell division (mitosis) and reproductive cell division (meiosis).
13. The student will be able to summarize the chemical make-up of enzymes and describe enzymatic action, as well as give the principle properties of enzymes.

14. The student will be able to define metabolism and give examples of various forms of metabolic processes.
15. The student will be able to demonstrate knowledge of chemical energy and the cellular respiratory process.
16. The student will demonstrate knowledge of protein synthesis.
17. The student will demonstrate knowledge of the types of tissues, membranes, and their functions.
18. The student will demonstrate knowledge of the organization of the integumentary system and its various functions.
19. The student will demonstrate knowledge of the relationship of the integumentary system to homeostasis.
20. The student will demonstrate knowledge of the development of bone tissue.
21. The student will demonstrate knowledge of bone tissue structurally and functionally.
22. The student will be able to identify the bones of the body and their prominent markings.
23. The student will demonstrate knowledge of the articulations of the body and explain their structural differences and their functions.
24. The student will demonstrate knowledge of the different types of muscle tissues, give their anatomical location and primary functions.
25. The student will demonstrate knowledge of the neuroelectrical chemical factors of muscle contraction.
26. The student will demonstrate knowledge of the mechanisms for supplying energy in muscle contraction.
27. The student will demonstrate knowledge of the types of muscle contraction.
28. The student will be able to name, give the attachments and action of the major groups of skeletal muscles.
29. The student will be able to explain the general function of the nervous system.
30. The student will be able to list the divisions of the nervous system and the composition of each division.
31. The student will be able to describe the general structure and function of a neuron.
32. The student will be able to explain how neurons are classified.
33. The student will be able to name the different types of neurological cells and describe their functions.
34. The student will be able to explain how an injured nerve fiber may regenerate.
35. The student will be able to explain the events that lead to the conduction of a nerve impulse.
36. The student will be able to explain the electrochemical changes associated with impulse transmission.
37. The student will be able to explain the electrochemical changes associated with synaptic transmission.
38. The student will be able to name the parts of a reflex arc and describe the function of each part.

39. The student will be able to name the different types of reflex arcs.

40. The student will be able to describe the coverings of the brain and spinal cord.

41. The student will be able to describe the vascular/cerebrospinal fluid system of the central nervous system.

42. The student will be able to describe and explain the structure, organization and function of the spinal cord.

43. The student will be able to describe and explain the structure, organization and function of the brain.

44. The student will be able to give the location and function of the spinal nerves.

45. The student will be able to give the location and function of the cranial nerves.

46. The student will be able to describe the structure, organization and function of the autonomic nervous system.

47. The student will be able to describe and explain the structure and function of the specialized sensory receptors.

48. The student will be able to give the location of the olfactory organs and explain their primary functions.

49. The student will be able to describe the structure and function of the tongue.

50. The student will be able to describe the structure and function of the ear.

51. The student will be able to describe the structure and function of the eye.

Course Outline: Human Anatomy and Physiology I

UNIT I

1. Introduction
    - A) Characteristics of Life
        - 1) Organization
        - 2) Irritability
        - 3) Adaptability
        - 4) Movement
        - 5) Growth
        - 6) Metabolism
        - 7) Reproduction
    - B) Anatomy and Physiology Defined

1) Subdivisions of anatomy and physiology

C) Terms of Location and Anatomical Position

2) Superior/Inferior

3) Anterior/Posterior

4) Ventral/Dorsal

5) Cranial/Caudal

6) Proximal/Distal

7) Internal/External

8) Peripheral/Deep

9) Medial

10) Lateral

11) Central

12) Parietal

13) Visceral

D) Fundamental Planes

1) Coronal or Frontal

2) Transverse or Horizontal

3) Sagittal

4) Medial

5) Lateral

E) Cavities

1) Ceolom

2) Thoracic

1) pericardial

2) pleural

3) Abdominal

4) Pelvic

5) Orbital

6) Nasal

7) Buccal

F) Organization of the body

1) Cells
2) Tissues
3) Organs
4) Systems
    a) integumentary
    b) skeletal
    c) muscular
    d) nervous
    e) endocrine
    f) circulatory
    g) respiratory
    h) digestive
    i) excretory
    j) reproductive

2. Chemistry of Life
    A) matter and elements
    B) how elements differ
    C) structure of matter
    D) electron arrangement
    E) electron arrangement vs. reactivity
    F) chemical bonding
        1) ionic bonding
        2) covalent bonding
            a) polar
            b) non-polar
        3) Hydrogent bonding
    G) Elements of biological importance
    H) Inorganic compounds
    I) Organic compounds
3. The cell
    A) The cell theory

B) The anatomy and physiology of the cell

1) Cytoplasmic membrane

2) Cytoplasm

3) Cytoplasmic organelles

a) endoplasmic reticulum

b) golgi bodies

c) ribosomes

d) centrioles

e) lysosomes

f) vacuoles

g) mitochondria

4) Nucleus

a) membrane

b) nucleoplasm

c) chromatin

d) nucleolus

5) Appendages

a) flagella

b) cilia

C) The movement of materials across the cell membrane

1) Diffusion

a) osmosis

b) dialysis

c) facilitated diffusion

2) Active transport

3) Endocytosis

a) pinocytosis

b) phagocytosis

D) The cell's cycle of growth (somatic cells)

1) Growth phase 1

2) Synthesis phase

3) Growth phase 2

4) Reproduction of somatic cells

a) Mitosis – nuclear division

1) prophase

2) metaphase

3) anaphase

4) telophase

b) Cytokinesis – cytoplasmic division

E) Division of reproductive cells

1) Meiosis

a) reduction division

1) prophase 1

2) metaphase 1

3) anaphase 1

4) telophase 1

b) equation division

1) prophase 2

2) metaphase 2

3) anaphase 2

4) telophase 2

F) Cellular Metabolism

1) Anabolism

2) Catabolism

3) Enzymes

a) composition

b) action

4) Cellular respiration

a) glycolysis

b) the kreb's cycle

c) the electron transport system/cytochrome system

5) Protein synthesis

a) transcription

b) translation

1. Histology
2. Specialization of Cells (Tissues)
   - A) Structure and Function of the tissues
     - 1) Epithelial
     - 2) Connective
     - 3) Muscular
     - 4) Nervous
   - B) Membranes
     - 1) Serous
     - 2) Mucous
     - 3) Cutaneous
     - 4) Synovial
3. The Integumentary System
   - A) The skin and its tissues
     - 1) Structure
     - 2) Function
   - B) Appendages and Glands of the skin
   - C) Pigmentation

UNIT II

1. The Skeletal System
   - A) Types of bones cells and their functions
     - 1) Osteoblasts
     - 2) Osteoclasts
     - 3) Osteocytes
   - B) The Bony Matrix
   - C) Types of Bone Tissue
     - 1) Compact
     - 2) Spongy

D) Membranes of Bone Tissue

1) Periosteum

2) Endosteum

E) Classification of Bones

1) Long

2) Short

3) Flat

4) Irregular

5) Sesamoid

F) Formation and Growth of Bones

1) Membranous Ossification

2) Endochondrial Ossification

3) Factors affecting bone growth and development

a) vitamins & minerals

b) hormones

c) physical exercise

4) The anatomy and physiology of fractures

G) Divisions of the Skeletal System and their Bones

1) Axial: 80 bones

2) Appendicular: 126 bones

a) pectoral girdle

b) pelvic girdle

3) Descriptive Terms

a) processes: process, condyle, tubercle, tuberosity, trochanter, crest, spine, head

b) cavities and depressions: groove, sinus, atrum, cornal, meatus, foramen, fissure fovea, fossa

H) Arthrology: joints of articulation

1) Synarthroses (immovable joints)

a) synchrondoses

b) sutures

2) Amphiarthroses (slightly movable joints)

a) joints between the vertebrae

b) joints between the pubis and sacroiliac

3) Synovial-Diathrososes (free moving joints

a) ball and socket

b) hinge

c) pivot

d) condyloid

e) gliding

f) saddle

4) Movements permitted by Diarthroses (synovial joints)

a) angular movements: flexion, extension, abduction, adduction, elevation, depression

b) circumduction

c) rotation

d) Special movements:

1) supination

2) pronation

3) inversion

4) eversion

5) protration

6) retraction

5) Practical Terms Related to the Skeletal System

a) sprain

b) dislocation

c) bursitis

d) arthritis

e) osteomyelitis

f) kyphosis

g) lordosis

h) scoliosis

2. The Muscular System

A) Types, location and function of muscle tissue

1) smooth muscle

2) cardiac muscle

3) striated or skeletal muscle

B) Contraction of muscle tissue

1) Conditions of contraction

a) stimuli

b) response to stimuli

c) chemical changes

2) Types of contraction

3) The physiology of skeletal muscle contraction

C) Skeletal muscles

1) Naming

a) directions of fibers

b) location

c) size

d) number of origins

e) shape

f) origin and insertion (attachments)

g) action

2) Grouping

a) prime mover – antagoist

b) prime mover – synergist

D) Skeletal Muscles and Their Bony Levers

1) The principle action of skeletal muscles

a) flexor

b) extensor

c) abductor

d) adductor

e) levator

f) depressor

g) supinator

h) pronator

i) sphincter

j) tensor

k) rotator

UNIT III

1. The Nervous System

A) The function of the Nervous System

B) The organs of the Nervous System

1) Brain

2) Spinal cord

3) Membranes

4) Nerve cords

5) Ganglion

6) Nerve nucleus

C) The Cells and Tissues of the Nervous System

1) Supportive tissues and their function

a) neuroglia cells

1) astrocytes

2) oligodendrocytes

3) microglia cells

4) ependyma

2) The Neuron

a) anatomy

1) nerve cell body

2) nissl bodies (chromtophilic substances)

3) dendrites

4) axons

5) axoplasm

6) axolemma

7) neurolemmacytes (Schwann cells)

b) function of neurons

c) types of neurons

1) unipolar

2) bipolar

3) multiopolar

4) sensory

5) association – connection-interneuron

6) motor

3) Nerve Impulse transmission

4) The Synapse and Impulse Transmission

5) Nerve Regeneration

6) The Function (behavior) Unit of the Nervous System

a) The relex arc

1) composition

2) types

2. The Divisions of the Nervous system

A) The Central Nervous System

1) Membranes

2) The spinal cord

a) structure

b) functions

c) pathways

1) ascending tracts

a) fasciculus gracilis

b) fasciculus cuneatus

c) spinothalamic (lateral and anterior)

2) descending tracts

a) corticospinal

b) reticulospinal

c) rubrospinal tracts

d) spinal cord injuries

1) spinal shock

2) paralysis

a) flaccid paralysis

b) spastic paralysis

2. The Brain

a) structural make-up

b) lobes

c) organization

1) cerebrum

2) ventricles

3) thalamus

4) hypothalamus

5) limbic system

6) pineal gland

7) pons

8) medulla oblongata

9) cerebellum

d) functions

B. The Peripheral Nervous System

1) The cranial nerves

a) location

b) function

2) The spinal nerves

a) location

b) function

C. The Autonomic Nervous System

1) Sympathetic division

2) Parasympathetic division

3) Autonomic transmitters

D) Clinical terms related to the Nervous System

3. Somatic and Special Senses

A) Receptors

1) Types

a) mechanical

1) free-nerve (dendritic) ending

2) meissner's corpuscles

3) merkel's disks

4) pacinian corpuscles

5) hair cells

6) barorecptors

7) proprioceptors

8) root hair plexuses

9) muscle spindles

10) golgi tendon organs

11) krause end bulbs

12) ruffini's corpuscles

b) photoreceptors

1) rods

2) cones

c) chemoreceptors

1) olfactory cells

2) taste buds (gustatory hairs)

3) aortic bodies

4) carotid bodies

d) thermoreceptors

e) nociceptors

2) Functions

B) The Sense of smell

1) Olfactory cells and their function

C) The Sense of Taste

1) Taste Buds and their function

D) The Ear

1) structural makeup

2) physiology of hearing

3) equilibrium

a) static

b) dynamic

E) The Eye

1) structural makeup

2) physiology of sight

3) common disorders