

## SYLLABUS

# BIO 211 - ANATOMY & PHYSIOLOGY I

Fall Semester, 2009

Lecture: CRN 30352, Section T03 12:30 - 1:55 T/Th, Rm. B125  
Lab: CRN 30353, Section T3A 9:00 - 12:00 Tuesday, or  
CRN 31187, Section T3B 9:00 - 12:00 Thursday, Rm. A219

Three Rivers Community College  
Norwich, Connecticut 06360

William "Kirk" Kirkpatrick, Professor

Office Phone: 383-5282  
Cell Phone: 235-3690  
e-mail: [williamkirk01@comcast.net](mailto:williamkirk01@comcast.net) or  
[wkirkpatrick@trcc.comnet.edu](mailto:wkirkpatrick@trcc.comnet.edu)

Office Hours: Monday and Wednesday; 10:00-11:00,  
Tuesday and Thursday; 2:00 – 3:00  
other times by appointment



**COURSE:** BIO 211 - Anatomy & Physiology I is the first semester of a two semester sequence. Its purpose is to facilitate the learning of body structure and function. The course is a requirement for health professions and some science degrees. It also satisfies the lab science requirements and 200 level requirements for the Liberal Art/Sciences and General Studies major. In order to learn all body systems, the student should complete this course along with BIO 212 - Anatomy & Physiology II. This is especially important if transferring to an institution with a major requiring a full academic year of anatomy and physiology or if the student is applying for Three River's nursing program. BIO 211 with a minimum grade of C is the pre-requisite for BIO 212. BIO 211 and 212 with a minimum grade of C+ is also the pre-requisite for the TRCC nursing program. BIO 211 presents the students with a lecture/laboratory study of basic biological chemistry, cell, tissue, organ, body fluid and cavity organization and nervous, skeletal, and muscular.

**PRE-REQUISITE FOR THE COURSE:** General Biology I (BIO 121) **and** Concepts of Chemistry (CHE 111) or equivalent with a minimum grade of C or instructor's permission

**CREDIT:** 4 credit hours consisting of 3 contact hours of lecture and 3 hours of laboratory per week during the Fall semester.

**REQUIRED TEXTS:**

*Fundamentals of Anatomy and Physiology* by Frederic Marini and Judi Nath, 8th edition, Benjamin-Cummings Publishers. (with COURSE COMPASS)

*Pictorial Anatomy of the Cat*, by Stephen Gilbert, University of Washington Press, 1999.

**RECOMMENDED TEXTS:** (optional)

*Visual Guide to Human Physiology* by Paul A. Krieger. Morton Publishing Company, 2008

*Get Ready for A&P* by Lori Garrett, Benjamin-Cummings Publishers, 2008 (An e-book version is on Course Compass)

*Outline of Cat Anatomy with Reference to Human*, by Stephen Gilbert, Univ. of Washington Press 2000, ISBN: 0-295-97818-x

\*The texts listed above will also be used for BIO 212. **The student is also expected to provide their own dissecting kit and gloves,** which are available from the bookstore.

**GENERAL COURSE OBJECTIVES:**

1. Provide students with a laboratory science to satisfy the science requirements and/or 200 level liberal arts course requirements of Three River's LAS or GS

Associate Degree.

2. To fulfill pre-requisite anatomy and physiology requirements for Three River's nursing program.
3. To fulfill pre-requisite and co-requisite anatomy and physiology requirements for dental hygiene and other allied health programs.
4. Provide students with an undergraduate level study of human body systems.
5. Provide students with a foundation for study of the medical, biological, or physical sciences.
6. Provide students with critical thinking and problem solving skills.
7. Demonstrate the biological sciences and how they relate to other disciplines.
8. Illustrate the interdependence of all life forms operating on natural laws with the physical environment.
9. Encourage not only awareness of the student's natural uniqueness but also their role as an interrelated biological organism of this planet.

### **CLASS ATTENDANCE:**

**Attendance class is required. Attendance is taken.** Absences can be very detrimental due to the nature of the material. An explanation of all absences is requested, especially if presented in advance when possible. *It is the student's responsibility to obtain materials and notes for any classes that they miss.*

### **METHODS OF STUDENT EVALUATION; GRADING POLICIES**

- A. The student's grade for the course represents their ability to master course objectives, attitude, rate of improvement, proficiency and knowledge of course material.
- B. Final letter grades are determined by converting accumulated points into a percentage score using the following formula:

percentage score = number of points you have accumulated on exams divided by  
the total number of points possible multiplied by 100

- C. Points are obtained by the following methods of evaluation:
  1. **Lecture**
    - a. Quizzes: Quizzes worth 15 points each will be given once a week on **Wednesdays** on line on the *Course Compass web site*. Their content and times available will be announced in the announcement section of Course Compass and by email . Each will consist of 15 multiple choice questions worth one point each. **If missed, they cannot be made-up**, however the lowest quiz score will be dropped at the end of the semester.
    - b. Major Exams: Three major exams of 150 points each will be given (**see schedule, p26**). Each will evaluate the student's knowledge over material given since the last major exam. They will consist of 75 multiple choice questions worth two points each.

- c. Basic biology & chemistry background: A pre-test of 30 points over basic biology and chemistry knowledge will be given. If a passing score is not attained, a post-test may be taken by the student. **See p. 6 for details.**
- d. Extra Credit: There will usually be extra credit homework assignments involving the Interactive Physiology (IP) modules.

2. **Laboratory:**

- a. Quizzes: A lab quiz over anatomical terminology worth 15 points and a lab quiz over the eye and ear worth 45 points will be given.
- b. Practical exams: Three identification type exams will be given: tissue identification, bone identification, and muscle identification. Each will be worth 50 points.
- c. Lab reports: A short report of a cellular biology lab exercise worth 15 points and a short report of an experiment of diffusion and osmosis, worth 20 points, will be written.

D. Percentage contribution of each evaluation process to the overall grade:

- a. weekly quizzes: 1.7% each, (based on 10 quizzes for the semester)
- b. major exams: 17% (each of the three)
- c. pre or post-test: 3.4
- d. anatomical term quiz: 1.7%
- e. eye/ear quiz: 5.1%
- f. tissue identification: 5.7%
- g. bone identification: 5.7%
- h. muscle identification: 5.7%
- i. cell lab report: 1.7%
- j. diffusion/osmosis lab report: 2.3%

E. Exam questions for lecture are multiple choice. For laboratory laboratory material evaluations, the questions may consist of multiple choice, true/false, fill in the blank, matching, identification, or essay.

F. Absence on examination days:

**Students are required to take exams as scheduled. Only in cases of extreme illness or family emergency, will exceptions be made. Notify the professor before the exam by email or phone and it is expected that the exam be made up within two week days.**

G. Final letter grades for the course are determined by the following steps:

1. Add all of the points the student has attained.
2. Divide the total points by the number of points possible to convert into a percentage score.

**\*\*3. The final course grade is determined from the overall course percentage score related to the following percentage scale:**

92 – 100% = A	80 - 81% = B-	68 - 69% = D+
90 - 91% = A-	78 - 79% = C+	60 - 67% = D
88 - 89% = B+	72 - 77% = C	0 - 59% = F
82 - 87% = B	70 - 71% = C-	

**\*\*The instructor reserves the right to use subjective evaluation, especially in cases where the final percentage score is on a borderline between grades.**

### **Procedure for Withdrawing from the Course(s):**

A student who finds it necessary to discontinue a course must complete a withdrawal form obtained from the Registrar's Office. **Students who do not withdraw by December 9, but stop attending will be assigned a "F" grade,** signifying failure and no credit. F grades count as courses attempted and may adversely affect the good standing status of the student receiving the grade.

### **Academic Integrity at Three Rivers**

*Academic integrity is essential to a useful education. Failure to act with academic integrity severely limits a person's ability to succeed in the classroom and beyond. Furthermore, academic dishonesty erodes the legitimacy of every degree awarded by the College. In this class and in the course of your academic career, present only your own best work; clearly document the sources of the material you use from others; and act at all times with honor (p. 17, TRCC Student Handbook)*

*The **Professor** for this course has the **right to confront** a student if there is **suspicion of dishonesty** as described in the section titled Definitions of Academic Dishonesty, p. 15-16 of the TRCC Student Handbook. Upon the outcome of that confrontation, the Professor has the **right to assign a 0 or F grade to that assignment/exam/evaluation or in severe cases, assign an F grade for the course.** In any case, the Academic Dean will be notified in writing of the incident and a record of the incident will be in file in the Academic Dean's Office. (See pp. 16-17 of the TRCC Student Handbook)*

### **Disabilities:**

If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to contact the Disabilities Counseling Services at 383-5240. To avoid any delay in the receipt of accommodations, you should contact the counselor as soon as possible. Please note that I cannot provide accommodations based upon disability until I have received an accommodation letter from the Disabilities Counselor. Your cooperation is appreciated.

### **Revisions to the Syllabus**

The instructor reserves the right to revise the academic schedule, objectives, and/or topical outline contained in this syllabus

**SPECIFIC OBJECTIVES FOR THE LECTURE PORTION OF THE COURSE** (objectives with an \* will not be covered formally in class but students are expected to learn on their own and will be tested).

**CLASSROOM CONTENT IS DIVIDED INTO THE FOLLOWING LEARNING UNITS. CORRESPONDING LEARNING UNITS WITH ADDITIONAL RESOURCES ARE FOUND ON THE COURSE COMPASS WEB SITE**

**I. Pre-Requisite Competencies**

It is expected that the student be competent in knowledge of basic biology chemistry so that a study of the human bodies structure and functions can be undertaken. This may be accomplished by a variety of means, the preferred being that the student review selected content they have learned in BIO 121 (General Biology I) and CHE 111 (Concepts of Chemistry) or equivalent taken as the pre-requisite courses for Anatomy & Physiology I. Methods of self instruction such as computer programs, videotapes, workbooks, or tutors are available.

At the beginning of the semester, students will be given a "pre-test" consisting of 60 multiple choice questions worth 30 points (1/2 pt. ea.) over this learning unit to determine the status of their basic biology/chemistry knowledge base and create a self review before the class starts. (see schedule, p. 27) It is a pass/fail test. Therefore if a score of 70% or better is attained, the student is automatically given the full 30 lecture points. If a score of 70% or better is not attained, no points will be given\*\*. However, the student can choose to take a "post-test of the same point value and number of questions. If a score of 70% or better is attained on the "post-test", the students score will be changed from 0 to 30 (full point value given as if the student passed the "pre-test". The "post- test" is taken by appointment anytime before Exam #1 is given (see class schedule)

**\*\*Failing the "pre-test" or the "post-test" is not justification for withdrawal from the course.**

Listed below is a list of competencies that will be tested over in the pre/post testing. These competencies deal with basic chemistry and cell biology which are covered in chapter 2 and 3 of the textbook.

- \*A. Be able to discuss the importance of matter and energy as it relates to the make-up of the life process
1. Define matter (solid, liquid, versus gas) and energy (potential versus kinetic and forms such as chemical, light, mechanical, nuclear, heat, etc.).
  2. Define chemical elements and list the symbols of and major functions of the biologically importance elements listed in figure 2-1, p. 30 and those shown in pink in the periodic table in appendix. Be aware that carbon, hydrogen, oxygen, and nitrogen are the most abundant elements making up the construction of life.

3. Describe atomic structure by defining: atom, subatomic particles (protons, neutrons, electrons), atomic number, atomic mass (weight), isotopes, and radioisotopes.
4. Be able to state what determines the difference of atoms of one element from another (atomic number).
5. If given the atomic number and atomic mass, be able to determine the number of protons, neutrons, and electrons making up the structure of those atoms.
6. Define electron energy levels (shells) and state the significance of the outermost energy level.

Organize matter into most complex structure be becoming familiar with the following:

7. Compare ionic and covalent bonding (single versus double versus polar).
  8. Define compounds, molecules, and ions (cation versus anion).
  9. When reading or writing ions in symbolic form, be able to interpret the superscript as to the type of electrical charge (positive or negative) and its intensity.
  10. When reading or writing a formula for a chemical compound, be able to interpret what elements are combined together and in what proportion. If reading a structural formula, also be able to interpret what type of chemical bonds are involved and the basic shape of the molecule.
  11. Define molecular weight. If given a formula for a chemical compound and the atomic weights of the elements involved, be able to determine the molecular weight.
- \*B. Describe the basics of chemical reactions by accomplishing the following:
1. Define chemical reaction, reactants, and products.
  2. Define metabolism, catabolism, anabolism, exergonic (exothermic), endergonic (endothermic), catalysts, and enzyme.
- \*C. Discuss the chemical make-up of living organisms based upon types of chemical compounds.
1. State the differences between inorganic and organic compounds and in reference to organic compounds, be able to define macromolecule, monomer, and polymer.
  2. Discuss the importance of water.
    - a. Define solution, solute, solvent, hydrophilic, and hydrophobic.
    - b. Define ionization, electrolyte, acid, base, salts, and minerals.
    - c. Discuss measurements of solution concentrations such as percentage, gram-percent (gm/dl), mg-percent (mg/dl), moles or millimoles/liter, milliosmoles/liter, milliequivalents per liter (mEq/l). (table 3-4 in appendix)
    - d. Be able to use the pH scale to measure the concentration of hydrogen ions in an aquatic solution such as body fluids. If given a pH number, be able to state if it is neutral, acidic or basic (alkaline) and its relative strength. Be able to define acidosis and alkalosis by you knowing the normal pH of human blood.
  3. Be able to discuss the role of carbohydrates in the life process.
    - a. Relate carbohydrates to sugars and starches and state the primary function of carbohydrates.
    - b. Relate simple sugars to monosaccharides and state the significance of glucose.
    - c. Relate complex sugars to disaccharides and polysaccharides. Define sucrose,

- glycogen, starch, and cellulose (plant fiber)
- d. Describe how monosaccharides can be bonded together to form disaccharides or polysaccharides by a chemical mechanism called dehydration synthesis. Describe how polysaccharides or disaccharides are broken apart into monosaccharides by a chemical mechanism called hydrolysis.
  - e. Be able to recognize the basic molecular structure of a carbohydrate.
4. Discuss the role of lipids in relation to the life process.
    - a. List the functions of lipids.
    - b. Be familiar with the terms: fatty acids (saturated versus unsaturated),
    - c. glycerol, di- and triglycerides, steroids, fat-soluble vitamins (A,D,E,K), prostaglandins, and phospholipids.
    - d. Relate the chemical mechanisms of dehydration synthesis and hydrolysis to the conversion of simple lipids like fatty acids to complex like triglycerides and visa versa.
    - e. Be able to recognize the basic molecular structure of a fatty acid and a steroid.
  5. Discuss the role of proteins in relation to the life process.
    - a. Define amino acids.
    - b. List the functions of proteins.
    - c. Be able to recognize the basic molecular structure of an amino acid.
    - d. Relate the chemical mechanism of dehydration synthesis and hydrolysis to the conversion of amino acids to polypeptides and visa versa.
    - e. Define peptide bond, antigen, antibody, and enzyme.
    - f. Briefly describe the mechanism of enzyme function using the terms substrate, active site, and product. (see page 56-57 of Martini)
  6. Briefly discuss the role of nucleic acids in relations to the life process.
    - a. Define nucleotides and be able to list the different types of N-bases.
    - b. Briefly describe the purpose of DNA and RNA.
  7. Discuss the role of adenosine tri-phosphate (ATP) for energy storage and transfer in biological chemical reactions
    - a. Define adenosine tri-phosphate (ATP) and adenosine di-phosphate (ADP).
- \*D. Be able to discuss the cell as the basic structure of the human body.
1. Be able to list the components of the cell theory. (see p. 67 of Martini)
  2. Describe the anatomy and physiology of a typical cell by being able to label a diagram, and/or describe the function of the following cellular structures:
 

cell membrane	endoplasmic reticulum	centrioles
centrosome	-granular vs agranular	ribosomes
nucleus	nuclear membrane	golgi complex
nucleoplasm	lysosome	chromatin
mitochondria	nucleolus	cytoplasm
  3. Describe amoeboid, ciliary, and flagella movement of cells.
  4. Briefly describe the process of cell reproduction.
    - a. Define mitosis and state the significant outcome of the process.
    - b. Describe basic chromosome structure and know how many human cells have.
    - c. Describe the main intracellular events that occur during the phases of mitosis.



d. Briefly compare mitosis and meiosis.

**\*will not be covered in class**

## II. Basic Biological Organization of the Human Body

Upon completion of a study of basic organization of the human body, the student should be able to correctly answer questions concerning the following:

- A. Be able to list and describe the characteristics of living material.
- B. Be able to describe the various levels of organization from atoms through organism level.
- C. Be able to list the various body systems.
- D. At the cellular level of biological organization, be able to describe the following:
  1. Distinguish between unicellular versus multicellular life forms. In reference to multicellular, understand what is meant by cell differentiation.
  2. Associated with cellular structures, be able to define and discuss the following in relation to respiration.

metabolism	acetyl co-enzyme A	Kreb's cycle
ATP-ADP	glycogenolysis	oxydative phosphorylation
glycolysis	mitochondrial structure	aerobic respiration
pyruvic acid	-outer/inner membrane	anaerobic respiration
glucose	-cristae	
glycogenesis	-matrix	

- E. Describe the organization of the potential dorsal and ventral cavities.
  1. Distinguish between cranial and vertebral cavity.
    - a. List contents of each.
    - b. Define meninges and state their function.
  2. Distinguish between the divisions of the ventral cavity.
    - a. List the major contents of the thoracic cavity.
    - b. Pertaining to the thoracic cavity, define
 

mediastinum	diaphragm	pericardial cavity
visceral pleura	pleural fluid	pericardial fluid
parietal pleura	pericardium	pleural cavity
    - c. List the major contents of the abdominal and pelvic cavity.
    - d. Pertaining to the above cavities, define:
 

visceral and parietal peritoneum	peritoneal fluid
peritoneal cavity	diaphragm

## III. Tissues:

Upon completion of a study of tissues, the student should be able to correctly answer questions concerning the following:

- A. Define tissues and list the four main tissue types.
- B. Describe epithelial tissue.
  1. List functions of epithelium, structural characteristics and specialization's of epithelial cells, and how they communicate with each other.
  2. Describe apocrine, holocrine, and merocrine secretion.
  3. Classify epithelial tissue by cellular shape, layers, and associated structure

4. Give an example of the location of the following epithelial types:
 

simple and stratified squamous	simple and stratified columnar
simple and stratified cuboidal	ciliated pseudostratified columnar
transitional	neuralepithelium
germinal epithelium	
  5. Briefly organize glandular epithelium into endocrine versus exocrine, and simple versus compound tubular.
- C. Describe connective tissue.
1. List the functions of connective tissue.
  2. List and describe structural characteristics of connective tissue, especially matrix and ground substance.
  3. Organize connective tissue types into connective tissue proper, fluid connective tissue, and supportive connective tissue.
  4. Distinguish between arrangement and types of intercellular material by defining:
 

reticular fibers	calcium hydroxyapatite
elastic fibers	dense vs loose connective tissue
collagenous fibers	regular vs irregular connective tissue
chondroitin sulfate	
  5. Define and state the function of the following connective tissue cells:
 

mesenchyme	osteocyte	hemocytoblast
adipocyte	osteoblast	mast cell
plasma cell	erythrocyte	chondrocyte
osteoclast	leukocyte	fibroblast
macrophage	platelet	melanocyte
  6. Describe the structure and locations of the following types of connective tissue.
 

loose	adipose	elastic cartilage
dense	reticular	fibrocartilage
regular	elastic	fibrous
irregular	collagenous	bone
areolar	hyalin cartilage	blood
  7. Describe the microstructure of cartilage by defining or labeling a diagram the following: perichondrium, matrix, lacuna, chondrocytes.
  8. Describe the microstructure of bone by defining or labeling a diagram the following: matrix, lacuna, Haversian canal, osteocytes, lamella, canaliculi, osteon.
  9. Compare the differences and similarities of providing nutrients to chondrocytes of cartilage versus osteocytes of bone.
- D. Be able to describe muscle tissue.
1. Describe the functions of and the characteristics of muscle tissue.
  2. Describe the basic structural characteristics and location of skeletal, smooth, and cardiac muscle.
- E. Briefly describe nervous tissue. (p. 140-141 of Martini only)
1. Briefly describe the characteristics of the tissue.
  2. Briefly define: neuron, cell body, axon, dendrite, and neuroglia.

#### IV. Skin:

Upon completion of a study of the integumentary system, the student should be able to correctly answer questions concerning the following:

- A. Define an organ, based upon tissue types functioning together, by using skin as an example.
- B. List functions of skin.
- C. Describe or label on a diagram, the following skin structures:
 

epidermis	hair(follicles, root, shaft)
stratum corneum	sebaceous glands
stratum granulosum	sweat glands
stratum basale	nerve receptors
melanocytes	pilomotor (arrector pili) muscle
keratinocytes	ceruminous glands
keratin	mammary glands/milk line
dermis	keratinization/keratinized

#### V. Organization and Communication Between Fluid Compartments:

Upon completion of a study of fluid compartments, the student should be able to correctly answer questions concerning the following:

- A. Organize the body into fluid compartments.
  1. Define total body water, intracellular, extracellular fluid, plasma and interstitial fluid.
  2. State the normal quantity of fluid in each of the above.
  3. Discuss the effect of age, sex, and quantity of adipose tissue on percentage of body weight made up of fluid.
  4. Describe the relative distribution of different types of electrolytes and protein between the fluid compartments.
  5. List the normal routes of intake and output of fluids.
  6. List and define miscellaneous extracellular fluid compartments.
  7. State the route of chemical communication between intracellular and interstitial fluids and between interstitial and plasma fluid compartments.
- B. Describe movement of chemicals through the cell membrane.
  1. Describe the molecular construction of the cell membrane.
    - a. Define phospholipid bilayer
    - b. Organize membrane proteins into the following and be able to define each:
 

integral vs peripheral protein	enzymes
fibrous vs globular protein	receptors
anchors	carrier (transport) proteins
recognition proteins	channel proteins (leak vs gated)
  2. Define permeability and its various degrees.
  3. Discuss simple diffusion through the cell membrane
    - a. Describe the cause of diffusion
    - b. Describe how a concentration gradient is needed and be able to calculate its size.

- c. List and discuss factors that will affect the speed of diffusion through cell membranes.
- 4. Describe osmosis
  - a. Define osmosis
  - b. State the cause of osmosis and relate to fluid osmolarity
  - c. State the normal plasma osmolarity levels
  - d. Define isotonic, hyper- and hypotonic, crenation, plasmolysis, hemolysis, normal saline, D5W, lactated Ringer's
- 5. Describe carrier mediated transport
  - a. Describe the details of and what affects the speed of facilitative diffusion (facilitative transport/passive transport)
  - b. Describe the details of and what affects the speed of active transport (pumps)
  - c. Describe the significance of the sodium/potassium ion exchange pump and its role in creating concentration gradients for those ions.
- 6. Describe vesicular transport
  - a. Distinguish between exocytosis and endocytosis
  - b. Pertaining to endocytosis, distinguish between receptor mediated mediated endocytosis, pinocytosis, and phagocytosis using terms like invagination and pseudopodia.
- 7. Define transmembrane potential. In relation to it, define resting membrane potential, state the cause of it, and how its maintained on all cell membranes.
- C. Discuss how chemicals move between plasma and interstitial fluid via capillaries.
  - 1. Describe the general path of blood flow around the body.
  - 2. Describe the importance of the capillaries for the overall life support of cells.
  - 3. Describe the anatomy of a capillary.
  - 4. Define the following and relate them to inward and outward movements fluids through capillary walls:
 

blood hydrostatic pressure	tissue oncotic pressure
tissue hydrostatic pressure	net oncotic pressure
net hydrostatic pressure	filtration pressure
plasma oncotic pressure	absorption pressure
- D. Discuss the role of the lymphatic system for body fluid regulation.
  - 1. Describe the basic anatomy of the lymphatic system.
  - 2. Describe routes of lymphatic drainage for various areas of the body.
  - 3. Discuss the composition of, formation of, purpose of, and movement of lymph.
  - 4. List structures not drained by lymphatics.
  - 5. List various causes of edema.

## VI. Skeletal System:

Upon completion of a study of the skeletal system, the student should be able to correctly answer questions concerning the following:

- A. List the major functions of the skeletal system.

- \*B. Describe the microscopic construction of bone tissue (review objective III-C-8, p 10).
- C. Organize the skeleton into axial and appendicular portions.
- D. Organize bones into long, short, flat and irregular.
- E. Describe the anatomy of long and short bones using the following terms:
 

epiphysis	epiphyseal plate
diaphysis	medullar cavity
articular cartilage	red and yellow marrow
periosteum	spongy and compact bone
metaphysis	trabeculae
endosteum	
- F. Differentiate between intramembranous and endochondral ossification.
- G. Organize the vertebral column in regions and intervertebral discs.
  1. Describe the anatomy of an intervertebral disc.
- H. Define and state the cause of the vertebral column curvatures.
- I. Organize skeleton articulations (joints).
  1. Define articulation and classify them into synarthrosic, amphiarthrotic, or diarthrosic according to degree of movement permitted.
  2. Classify joints according to structure into sutures, synchondrosis, syndesmosis, symphysis, and synovial.
  3. Diagram and discuss the basic structure of a synovial joint.
- \*J. Define and illustrate on yourself the following joint movements:
 

flexion	eversion
extension	supination
abduction	pronation
adduction	protraction
rotation	retraction
circumduction	dorsiflexion
inversion	plantarflexion
- \*K. Define: ligament, tendon, tendon sheath, and bursae

## VII Nervous System:

Upon completion of a study of the nervous system, the student will be able to correctly answer questions concerning the following subject matter:

- A. Describe the overall construction, organization, and terminology associated with nervous tissue.
  1. List the specialized characteristics of nervous tissue.
  2. Describe the organization of neurons.
    - a. Describe the following parts of the neuron: cell body, axon, dendrites, telodendria, myelin sheath, node of Ranvier, Schwann cells and neuralemma.
    - b. Differentiate between the following types of neurons:
 

myelinated	alpha, beta, and gamma
non-myelinated	motor/efferent
unipolar	sensory/afferent

**\*will not be covered in class**



- D. Diagram and discuss the anatomy of the brain.
1. Organize and list the main structures of the telencephalon, diencephalon, mesencephalon, rhombencephalon, brain stem, and diagram the connection of each.
  2. Diagram and describe the cerebrum using the following terms:
 

cerebral hemisphere	convolutions
cerebral cortex	sulcus
longitudinal fissure	fissure
central sulcus	primary motor area
lateral fissure	pre-motor area
transverse fissure	somesthetic area
frontal lobe	corpus callosum
parietal lobe	optic chiasma
occipital lobe	basal nucleus
temporal lobe	limbic system
  - \*3. Describe the location of and list the functions of the following lower brain structures: thalamus, hypothalamus, midbrain, pons, medulla, cerebellum.
- E. Diagram and discuss the parts of and the function of the spinal cord.
1. Given a diagram of a cross-section view of the spinal cord, be able to divide the gray matter into anterior and posterior horns.
  2. State the purposes of the following spinal nerve tracts: spinocerebellar, funiculus gracilis, funiculus cuneatus, rubrospinal, spinothalamic, corticospinal, pyramidal, and extrapyramidal.
  3. State the level at which the spinal cord terminates.
  4. Define cauda equina.
  5. Divide the spinal cord into cervical, thoracic, lumbar, and sacral segments.
- F. Describe the anatomy and function of the meninges by defining dura mater, venous sinus, epidural space, subdural space, arachnoid mater, subarachnoid space, and pia mater.
- G. State the origin and trace the path of circulation of cerebro-spinal fluid using the following terms:
- |                    |                                 |
|--------------------|---------------------------------|
| choroid plexus     | aqueduct of Sylvius             |
| lateral ventricles | 4th ventricle                   |
| foramen of Monroe  | foramen of Luschka and Magendie |
| 3rd ventricle      | arachnoid villi                 |
- H. Discuss the organization of the peripheral nervous system.
- \*1. State the name, number, and general function of the cranial nerves.
  - \*2. Describe spinal nerves.
    - a. State the total number and number of cervical, thoracic, lumbar, and sacral, and coccygeal.
    - b. Describe the origin of spinal nerves by defining dorsal and ventral roots, dorsal root ganglia, anterior and posterior rami.
  - \*3. Define, state the location of, and the spinal nerves involved in the make-up of the cervical, brachial, lumbar, and sacral plexus.

**\*will not be covered in class**

- \*4. State the general location and function of the following peripheral nerves: axillary, musculocutaneous, radial, median, ulnar, femoral, obturator, sciatic, pudendal, and phrenic nerves.
- \*5. Organize sensory receptors:
  - a. Differentiate general receptors by location: exteroceptors, proprioceptors, interoceptors.
    - (1.) Describe type A and C pain nociceptors
    - (2.) Briefly organize thermoceptors, mechanoceptors (tactile, baroceptors, proprioceptors), and chemoceptors.
  - b. Briefly describe special receptors (photo, auditory, gustatory, olfactory)
- I. Describe the reflex arc as the basic function of the nervous system.
  - 1. Using the spinal cord, correctly locate sensory, internuncial, and anterior horn cells and describe the path of impulse conduction for the myotactic (knee jerk), and withdrawal reflex.
  - 2. Trace the pathway sensory nerve impulses would take as they ascend up the spinal cord to the brain using the dorsal column and spinalthalamic tracts.
  - 3. Trace the pathway motor nerve impulses would take as they descend down the spinal cord from the brain using the corticospinal tracts.
- J. Define the purpose of and describe the make-up of the autonomic nervous system.
  - 1. Contrast autonomic and somatic reflexes.
  - 2. Discuss the difference between the parasympathetic and sympathetic divisions using such terms as:
 

craniosacral	*celiac, superior and inferior
thoracolumbar	mesenteric ganglia
pre-ganglionic fibers	adrenergic fibers
post-ganglionic fibers	cholinergic fibers
sympathetic chain ganglia	
  - 3. Be able to describe the effect of sympathetic or parasympathetic stimulation on any major visceral organ.

### VIII. Myology (study of muscle)

Upon completion of a study of muscle tissue, the student should be able to correctly answer questions concerning the following:

- A. List and define properties of muscle tissue.
- B. Contrast skeletal, smooth, and cardiac muscle tissue according to cellular structure, location, arrangement, innervation, and physiological properties.
  - 1. Describe cellular structure of the three muscle types using the following terms:
 

muscle fiber	striations
sarcolemma	I, A, H, and Z bands
sarcoplasm	intercalated discs
myofibrils	tight junctions
multinucleated	
  - 2. Describe location of the muscle types.

**\*will not be covered in class**



3. Contrast innervation of muscle tissue types and define motor end plate.
  4. Define motor unit.
  5. Contrast the basic physiological differences between muscle tissue types according to speed of contraction, latent period, fatigue, refractory periods all or none principle, tonus, tetany, isometric and isotonic contraction.
- C. Describe the overall anatomy of a skeletal muscle.
1. Describe the gross structure of a skeletal muscle by defining origin, insertion, and belly.
  2. Describe muscle attachments such as tendons and aponeuroses.
  3. Describe the fascia arrangement using the terms: epimysium, fasciculus, perimysium, and endomysium.
- D. Describe the ultra-micro structure of skeletal muscle fibers using the following terms:
- |                   |                        |               |
|-------------------|------------------------|---------------|
| motor end plate   | sarcoplasmic reticulum | myosin        |
| sarcolemma        | longitudinal tubules   | cross bridges |
| myofibrils        | cisternae              | Z-bands       |
| synaptic cleft    | T-tubules              | sarcomere     |
| synaptic vesicles | triad                  | troponin      |
| sarcoplasm        | myofilaments           | tropomyosin   |
| calcium           | actin                  |               |
- E. Describe the contractile mechanism for skeletal muscle.
1. Discuss stimulation of the muscle fiber by describing the conduction across the motor end plate, depolarization of the sarcolemma and conduction into the myofibrils by T-tubules.
  2. Describe release of calcium ions and the calcium pump associated with the sarcoplasmic reticulum.
  3. Describe the ratchet theory of contraction using the relationships of calcium, actin complex, myosin, troponin, tropomyosin, ATP, ADP, creatine phosphate, and creatine.
  4. Discuss ATP replacement by defining aerobic, anaerobic respiration, lactic acid, and oxygen debt.
  5. List causes of skeletal muscle fatigue.
  6. List the effects of exercise on skeletal muscle.
- F. Discuss how muscles work as groups using such terms as prime mover, synergistic muscles, and antagonistic muscles.
- \*G. Identify the location of major muscles and muscle groups of the body.  
(Correlation with lab work)

**\*will not be covered in class**

## **SPECIFIC OBJECTIVES FOR THE LABORATORY PORTION OF THE COURSE**

**LABORATORY CONTENT IS DIVIDED INTO THE FOLLOWING LEARNING UNITS. CORRESPONDING LEARNING UNITS WITH ADDITIONAL RESOURCES ARE FOUND ON THE COURSE COMPASS WEB SITE**

### **I. Introduction to the Human Body Lab**

Upon completion of the following laboratory studies, the student should be able to correctly answer questions concerning the following:

- A. Discuss the derivation of medical terminology.
- B. Define and correctly use anatomical directions, planes, and regions when describing the human body.
- C. Organize the body into its potential body cavities and list major organs found in each.
- D. Locate exterior features and landmarks of the human body.

### **II. Cell Structure and Mitosis Lab**

Upon completion of a lab study of microscopic usage, cell structure, and mitosis, the student should correctly complete a lab report.

- A. Identify the major parts of a microscope and use the instrument effectively in study.
- B. Be able to prepare a wet-mount slide for study under a microscope.
- C. Identify major cellular structures with a light microscope using a variety of live and prepared specimens.
- D. Identify cells in various stages of mitosis.

### **III Identification of Tissues Lab**

The following tissue types are to be correctly identified by the student on a lab practical exam:

- A. Epithelial tissue:
 

<ol style="list-style-type: none"> <li>1. simple squamous</li> <li>2. stratified squamous</li> <li>3. simple cuboidal</li> <li>4. stratified cuboidal</li> </ol>	<ol style="list-style-type: none"> <li>5. simple columnar</li> <li>6. stratified columnar</li> <li>7. ciliated pseudostratified columnar</li> <li>8. transitional</li> </ol>
--	--
  
- B. Connective tissue:
 

<ol style="list-style-type: none"> <li>1. areolar</li> <li>2. adipose</li> <li>3. reticular</li> <li>4. hyalin cartilage</li> <li>5. elastic cartilage</li> </ol>	<ol style="list-style-type: none"> <li>6. fibrocartilage</li> <li>7. elastic</li> <li>8. collagenous</li> <li>9. bone</li> <li>10. blood cells (erythrocytes, leukocytes, platelets)</li> </ol>
---	---
  
- C. Muscle tissue: (smooth, skeletal, versus cardiac)
- D. Nervous tissue: (neurons versus glial cells)

#### IV. Principles of Diffusion and Osmosis Lab

Upon completion of experimental procedures and terminology associated with diffusion through a liquid and colloidal solution, osmotic pressure, and tonicity, the student should correctly complete a laboratory report of their data and conclusions.

#### V. Anatomy and Physiology of the Ear Lab

Upon completion of a study of the ear, the student should be able to correctly answer questions concerning the following:

- A. Describe the anatomy of the ear by locating and stating the functions of the following:

temporal bone	-stapes	scala vestibula
mastoid process	eustachian tube	cochlear duct (scala media)
outer, middle, inner ear	stapedius	basilar membrane
cerumenous glands	tensor tympani	tectoral membrane
auricle	semicircular canals	organ of Corti
tympanic membrane	cochlea	scala tympani
ear ossicles	oval window	vestibular-cochlear nerve
-malleus	round window	endolymph
-incus	vestibular membrane	perilymph

- \*B. Define middle ear (bone) and nerve deafness.

**\*will not be covered in class**

#### VI. Anatomy and Physiology of the Eye Lab

Upon completion of a study of the eye and its associated structures, the student should be able to correctly answer questions concerning the following:

- A. List the five special senses.
- B. Briefly describe the orbits.
- List the openings into the orbit and their purpose.
  - List the contents of the orbit.
- C. Describe the construction of the anterior coverings of the orbit.
- State the purpose of the eyelids.
  - Define medial and lateral angles, palpebral fissure, conjunctiva, conjunctival sac, tarsal plates, and their associated glands.
  - Locate, state the nerve supply, and the function of the levator palpebrae superioris and orbicularis oculi muscle.
- D. Describe the lacrimal apparatus.
- E. Locate, state the nerve supply, and the function of the muscles that move the eyeball.
- F. Describe the anatomy of the eye by locating and stating the functions of the following:

sclera	ciliary body	optic disc
cornea	suspensory ligaments	anterior and posterior cavity
choroid	retina	anterior and posterior chamber
iris	rods and cones	aqueous humor
pupil	macula	vitreous humor
lens	fovea centralis	optic nerve

## \*G. Define the following

ptosis	astigmatism
glaucoma	conjunctivitis
myopia	accommodation
hypermetropia	refraction

## H. Successfully complete the following optional exercises:

near point of accommodation	two-point discrimination
visual acuity	location of tastebuds
color blindness	examination of retina
Rinne and Weber hearing test	examination of tympanic membrane
localization	olfactory nerve testing

**\*will not be covered in class****VII Anatomy of the Skeleton Lab**

Upon completion of a study of the skeleton, the student should be able to correctly identify the following on a timed laboratory practical examination.

## A. Be familiar with the following terms as they apply to skeletal parts.

condyle	trochanter	fossa	spine
crest	tubercle	sinus	foramen
head	tuberosity	meatus	

## B. Identify any bone as a member of the axial or appendicular skeleton.

## C. Given a human skull, accurately identify the following bones and their details:

1. frontal bone
  - a. frontal sinus
  - b. supraoptic foramen
2. parietal bone
3. temporal bone
  - a. mastoid process
  - e. mandibular fossa
  - b. external auditory meatus
  - f. styloid process
  - c. zygomatic process
  - g. carotid canal
  - d. zygomatic arch
  - h. jugular foramen
4. occipital bone
  - a. foramen magnum
  - c. occiput (external occipital protuberance)
  - b. occipital condyles
5. sphenoid
  - a. sella turcica
  - c. foramen ovali
  - b. optic foramen
  - d. foramen rotundum
  - c. sphenoid sinus
6. ethmoid
  - a. cribriform plate
  - d. ethmoid sinus (air cells)
  - b. concha
  - e. perpendicular plate
  - c. crista galli
7. maxillary bone (maxilla)
  - a. alveolar process
  - c. infraorbital foramen
  - b. maxillary sinus

8. zygomatic
    - a. temporal process
    - b. zygomatic arch
  9. lacrimal
  10. palatine
  11. nasal
  12. vomer
  13. mandible
    - a. body
    - b. condyloid (condylar) process
    - c. alveolar process
    - d. coronoid process
    - e. ramus
    - f. angle
    - g. body
    - h. mental foramen
    - i. mandibular foramen
  14. hyoid
  15. other structures
    - a. orbits (superior and inferior orbital fissures)
    - b. sagittal suture
    - c. coronal suture
    - d. lambdoidal suture
    - e. squamosal suture
- D. If given a vertebra, identify its basic parts:
- |  |                                     |
|--|-------------------------------------|
| spinous process                                | odontoid process (dens) (axis only) |
| transverse process                             | demifacet (thoracic only)           |
| superior and inferior articular process/facets | transverse foramen (cervical only)  |
| pedicle  | intervertebral foramen              |
| vertebral foramen                              | lamina                              |
| body   |                                     |
- E. Identify the intervertebral disc and define its parts; annulus fibrosus and nucleus pulposus (p. 277-280). Discuss disc problems (p. 279-280)
- F. List the types and number of vertebrae, according to their locations. If given an individual vertebrae, be able to identify if it is a cervical, thoracic, lumbar, or sacral.
- G. Identify the first two cervical vertebrae as the atlas and the axis and state how each allows head movement.
- H. If given a sternum, differentiate between its manubrium, body, xiphoid process, sternal (jugular) notch, and sternal angle
- I. State the number of pairs of and the difference between true, false, and floating ribs and identify the following parts: body or shaft, head, neck, tubercle, angle, costal groove, costal cartilages, and intercostal spaces.
- J. Identify the following bones of the pectoral girdle and their details:
1. clavicle
    - a. sternal end
    - b. acromial end
  2. scapula
    - a. supraspinous fossa
    - b. infraspinous fossa
    - c. subscapular fossa
    - d. glenoid fossa
    - e. acromion process
    - f. spine
    - g. coracoid process
    - h. superior and inferior angle
    - i. body
- K. Identify the following bones of the upper extremities and their details:
1. humerus
    - a. head
    - b. greater tubercle
    - f. capitulum
    - g. trochlear
    - k. anatomical/surgical neck

- c. lesser tubercle
- d. medial epicondyles
- e. lateral epicondyles
- 2. ulna
  - a. olecranon process
  - b. semilunar (trochlear) notch
- 3. radius
  - a. styloid process
- 4. carpals: scaphoid, lunate, triquetrium, pisiform, trapezium, trapezoid, capitate, hamate (Also define carpal tunnel and carpal tunnel syndrome)
- 5. metacarpals: I - V
- 6. phalanges: proximal, middle, distal
- L. Identify the pair of coxal (innominant), that as hip bones, form the pelvic girdle. Identify the areas of the coxal bone that are the ilium, ishium, and pubis. Also identify the following features:
  - 1. iliac crest
  - 2. pubic symphysis
  - 3. anterior superior iliac spine
  - 4. greater sciatic notch
  - 5. ischial tuberosity
  - 6. acetabulum
  - 7. obturator foramen
  - 8. greater or false pelvis
  - 9. lesser or true pelvis
  - 10. pelvic brim
  - 11. posterior superior iliac spine
  - 12. ischial spine
  - 13. pelvic inlet
- M. Identify the following bones of the lower extremities and their details:
  - 1. femur
    - a. head
    - b. neck
    - c. greater & lesser trochanter
    - d. shaft
    - e. medial & lateral condyles
    - f. medial & lateral epicondyle
  - 2. patella
  - 3. tibia
    - a. medial and lateral condyles
    - b. medial malleolus
    - c. tibial tuberosity
  - 4. fibula
    - a. head
    - b. lateral malleolus
  - 5. tarsals: calcaneus, talus, navicular, cuboid, cuneiforms (first, second, third)
  - 6. metatarsals: I - V
  - 7. phalanges: proximal, middle, distal

### VIII. Dissection of Major Skeletal Muscles of the Cat

Upon completion of dissection, the students should be able to correctly identify the following muscles on a dissected cat, a diagram of human musculature, and/or upon themselves on a laboratory practical exam.

#### A. Superficial Thoracic Muscles:

- 1. pectoralis major
- 2. pectoralis minor

#### B. Abdominal wall muscles:

- 1. external abdominal oblique
- 2. internal abdominal oblique
- 4. transversus abdominis
- 5. rectus abdominis

3. linea alba (a line of connective tissue on midline where the aponeuroses of the above muscles fuse together)
- C. Deep Thoracic muscles:
1. serratus ventralis (anterior)
  2. scalenus ("the scalenes)
  3. external intercostals
  4. internal intercostals
- D. Superficial back muscles:
1. clavotrapezium
  2. clavobrachialis
  3. acromiotrapezius
  4. spinotrapezius
  5. latissimus dorsi
- E. Deep back muscles:
1. multifidus spinae
  2. longissimus dorsi
  3. spinalis dorsi
- F. Muscles of the neck:
1. sternomastoid
  2. cleidomastoid
  3. sternohyoid
  4. sternothyroid
  5. cricothyroid
  6. digastric
  7. mylohyoid
  8. thyrohyoid
- G. Deep muscles of the neck and back:
1. rhomboideus minor (cervicis)
  2. rhomboideus major (thoracis)
  3. splenius
- H. Muscles of the head:
1. masseter
  2. temporalis
- I. Shoulder muscles:
1. supraspinatus\*
  2. infraspinatus\*
  3. teres major\*
  4. subscapularis\*
  5. acromiodeltoid
  6. spinodeltoid
  7. teres minor
- \*"rotator cuff" muscles
- J. Muscles of the upper arm (brachium)
1. biceps brachii
  2. triceps brachii
  3. brachialis
- K. Superficial muscles of the medial side of the thigh:
1. sartorius
  2. gracilis
- L. Superficial muscles of the lateral side of the thigh:
1. biceps femoris☒
  2. tensor fascia latae
- M. Deep muscles of the medial side of the thigh:
1. pectineus
  2. adductor longus
  3. adductor femoris
  4. psoas major
  5. semimembranosus☒
  6. semitendinosus☒
- ☒"hamstring" muscles
- N. Deep muscles of the lateral side of the thigh
1. vastus medialis●
  2. rectus femoris●
  3. vastus lateralis●
  4. vastus intermedius●
  5. semimembranosus (deep surface)
  6. semitendinosus (deep surface)
- "quadriceps (quads) femoris" group
- O. Muscles of the calf

1. tibialis anterior (cranialis)
  2. gastrocnemius
  3. soleus
- P. Muscles of the hip
1. gluteus maximus♦
  2. gluteus medius
- ♦Note the position of the sciatic nerve deep to the belly of this muscle

## **TOPICAL OUTLINE - BIO 211 - HUMAN ANATOMY & PHYSIOLOGY I**

- I. Review of chemical organization of Life
  - A. Matter and energy
    1. Elements of life
    2. Atoms, ions, and molecules
    3. Chemical bonding
  - B. Chemical makeup of life
    1. Water, solutions, and measurement
    2. Biological organic compounds
  - C. Chemical reactions
    1. Types of metabolic reactions
    2. ATP
    3. Role of enzymes and nucleic acids
  
- II. Review of cellular structure and organization
  - A. Cell theory
  - B. Cellular structure and function
    1. Organelles and inclusions
    2. Respiration
    3. Movement
    4. Mitosis
  
- III. Organization of the Human Body
  - A. Structural interrelationships
  - B. Homeostasis and feedback regulation
  - C. Respiration
  - D. Body cavities
    1. Dorsal cavity
      - a. subdivisions
      - b. contents
      - c. meninges
    2. Ventral cavity
      - a. subdivisions
      - b. contents
      - c. pleura and peritoneum
  - E. Anatomical directions, planes, and regions



## IV. Tissues

- A. Definition and types of tissues
- B. Organization of epithelium
- C. Organization of connective
- D. Muscle and nervous

## V. Skin as an example of an organ

- A. Functions of skin
- B. Epidermal and dermal structures

## VI. Fluid compartment organization

- A. Fluid compartments
  - 1. Definitions and quantities
  - 2. Chemical compositions
  - 3. Intake and output
- B. Cell membrane physiology
  - 1. Molecular structure
  - 2. Transport across cell membranes
  - 3. Membrane electrical potentials
- C. Capillary dynamics
  - 1. Structure
  - 2. Pressures
- D. Lymphatic system

## VII. Skeletal system

- A. Organization and general structure
- B. Ossification
- C. Vertebral column curvatures
- D. Joint organization and movements
- E. Anatomy of the skeleton

## VIII. Nervous system

- A. Overall construction, organization and terminology
  - 1. Neurons
  - 2. Nerves
- B. Nerve impulses
- C. Synapses
- D. Central nervous system
  - 1. Brain
  - 2. Spinal cord
  - 3. Meninges
  - 4. Cerebrospinal fluid
- E. Peripheral nervous system
  - 1. Cranial nerves
  - 2. Spinal nerves and nerve plexus
  - 3. Major peripheral nerves
  - 4. Sense receptors
  - 5. Reflex arcs
  - 6. Autonomic nervous system
  - 7. Eye and ear and other special senses

IX. Muscular system

- A. Organization, structure, and characteristics of muscle tissue
- B. Anatomy of a typical skeletal muscle
- C. Microstructure of skeletal muscle fibers
- D. Physiology of contraction
- E. Location of major skeletal muscles

**TENTATIVE ACADEMIC SCHEDULE-lecture  
Fall Semester, 2009**

**Lecture:** Tuesday and Thursday, 12:30 - 1:55, room B125

Aug. 27: Introduction to the course

Sept. 1: Body cavities and their linings  
Sept. 3: Pretest over Unit I given in lab/tissues

Sept. 8: Pretest over Unit I given in lab/tissues  
Sept. 10: tissues

Sept. 15: Skin  
Sept. 17: Fluid compartments

Sept. 22: Fluids/cell membranes  
Sept. 24: Diffusion/osmosis

Sept. 29: Carrier and vesicular transport  
Oct. 1: Capillary exchange

Oct. 6: **Exam #1**  
Oct. 8: Capillary exchange/lymphatics

Oct. 13: Skeletal structure  
Oct. 15: Joints

Oct. 20: Nervous Tissue  
Oct. 22: Nervous tissue/membrane potentials

Oct. 27: Nerve impulse  
Oct. 28: Polarization/refractoryness/synapse

Nov. 3: Synaptic transmission  
Nov. 5: Neurotransmitters/CNS layout

Nov. 10: **Exam #2**  
Nov. 12: Brain

Nov. 17: Spinal cord  
Nov. 19: Meninges and CSF

Nov. 24: reflex arc  
Nov. 26: No classes: Thanksgiving Break

Dec. 1: Cranial nerves  
Dec. 3: Spinal and peripheral nerves

Dec. 8: Autonomic nervous system  
Dec. 10: Muscle tissue

Dec. 15: Muscle contraction  
Dec. 17: **Exam #3**

**TOPIC ORDER AND TEXTBOOK READING**

Unit 1: Review of Chemical and Cellular Organization; \*Martini: chapters 2 & 3 (omit 70-72, 89-100);

Unit 2: Biological organization; Martini: pp. 2 - 16, 22 - 25, 930 - 946;

Unit 3: Tissues; Martini: chapter 4;

Unit 4: Skin; Martini: chapter 5;

Unit 5: Organization and communication of fluid compartments; Martini: pp. 1010 - 1017, 67 - 72, 89 - 100, 724 - 727, 734 - 737, 777 - 781, 783 - 788;

Unit 6: Skeletal system; Martini: chapters 6 - 9;

Unit 7: Nervous system; Martini: chapters 12 - 16;

Unit 8: Muscular system; Martini: chapters 10 - 11;

\**Fundamentals of Anatomy & Physiology*, by Martini and Nath, Benjamin-Cummings Publishers, 8th ed.

**Tentative Academic Schedule - Lab**  
**Fall Semester, 2009**  
**Tuesday or Thursday - 9:00 - 12:00, Rm. A219**

**Tuesday Lab**

<u>Date</u>	<u>Activity</u>
Sept. 1:	Lecture: Unit II: Biological Organization
Sept. 8:	<b>Pre-test</b> over Unit I objectives (see lecture schedule) followed by Anatomical Terminology exercise; (pp. 15 –19 and lab handout)
Sept. 15:	<b>Quiz</b> over anatomical terminology followed by Cell Structure and Mitosis lab exercise (chapter 3 and lab handout)
Sept 22:	Tissue anatomy; microscopic examination: (chapter 4 and lab handout)
Sept. 29:	Muscle and Nervous tissue lecture followed by Tissue anatomy (con't.)
Oct. 6:	Diffusion and osmosis lab experiment (chapter 3 and lab handout)
Oct. 13:	<b>Lab practical exam</b> over tissues; Special senses - ear lab; chp. 17, <i>Applications Manual</i> : pp. 104-106 and handouts
Oct. 20:	Special senses (con't) - eye lab (with dissection*) chp. 17 and handout
Oct. 27:	<b>Quiz</b> over eye/ear anatomy: Begin study of bones; chp. 6-9
Nov. 3:	Skeletal anatomy study (con't)
Nov. 10:	Cat muscle dissection*; (Muscles chapter in Gilbert and chp 11 in Martini)
Nov. 17:	<b>Lab practical exam</b> over bones; followed by muscle dissection* (con't)
Nov. 24:	No formal lab session however, the lab will be open and instructors will be there
Dec. 1:	Muscle dissection* (con't)
Dec. 8:	<b>Lab practical exam</b> over muscles
Dec. 15:	Lecture over Unit VIII: Myology lecture objectives

**Thursday Lab**

<u>Date</u>	<u>Activity</u>
Aug. 27:	Lecture: Unit II: Biological Organization
Sept. 3:	<b>Pre-test</b> over Unit I objectives (see lecture schedule) followed by Anatomical Terminology; (pp. 15 -19 and lab handout)
Sept. 10:	<b>Quiz</b> over anatomical terminology followed by: Cell Structure and Mitosis lab exercise (chapter 3 and lab handout)
Sept. 17:	Tissue anatomy; microscopic examination: (chapter 4 and lab handout)
Sept. 24:	Muscle and Nervous tissue lecture followed by Tissue anatomy (con't.)
Oct. 1:	Diffusion and osmosis lab experiment, (chapter 3 and lab handout)
Oct. 8:	<b>Lab practical exam</b> over tissues; Special senses - ear lab; chp. 17, <i>Applications Manual</i> : pp. 104-106 and handout
Oct. 15:	Special senses (con't) - eye lab (with dissection*) chp. 17 and handout
Oct. 22:	<b>Quiz</b> over eye/ear anatomy: Begin study of bones; chp. 6-9
Oct. 29:	Skeletal anatomy study (con't)
Nov. 5:	Cat muscle dissection*; (Muscles chapter in Gilbert and chp 11 in Martini)
Nov. 12:	<b>Lab practical exam</b> over bones followed by Muscle dissection* (con't)
Nov. 19:	Muscle dissection* (con't)
Nov. 26:	No classes: Thanksgiving Break
Dec. 3:	<b>Lab practical exam</b> over muscles
Dec. 10:	Lecture over Unit VIII: Myology lecture objectives

\*dissection tool required; gloves recommended

All readings are from Martini's *Fund. of Anatomy/Physiology* unless stated otherwise

## LAB HOURS - ROOM A219

### FALL SEMESTER - 2009

**MONDAY: 9:30AM - 5:00 PM**  
**TUESDAY: 9:00 AM - 8:00 PM**  
**WEDNESDAY: 9:30 AM - 5:00 PM**  
**THURSDAY: 9:00 AM - 9:00 PM**  
**FRIDAY: 8:00 AM - 11:00 PM**  
 (Friday afternoon by arrangement)

### LAB USAGE

1. All students enrolled in General Biology, Human Biology, Anatomy & Physiology, Microbiology, and Genetics are welcome to use the lab during the lab hours posted above.
2. If you plan on using the lab when another instructor has a class in session, please check with that instructor at the beginning of their class. (refer to the class schedule below)
3. If there is another class in session, please work quietly at the back of the room.
4. The lab may be closed during certain times of the semester for testing purposes. These times will be posted on the door, as needed.
5. Anatomy and Physiology students cannot dissect during open lab times when there is a non-dissection class in session (gen. biology and human biology)

### **ROOM A219 CLASS SCHEDULE**

Monday	Tuesday	Wednesday	Thursday	Friday
	9:00 - 12:00 A&P I Kirkpatrick		9:00 - 12:00 A&P I Kirkpatrick	8:00-11:00 A&P I Skiba
1:00 - 4:00 A&P I Kirkpatrick		1:00 - 4:00 A&P I Kirkpatrick		
	5:00-8:00 A&P I Skiba		6:00-9:00 A&P I Simmons	

