SYLLABUS

BIO 212 - ANATOMY & PHYSIOLOGY II

Summer, July 1 – August 11, 2008

Lecture: CRN 50086; Section M6L; 8:00 - 12:00 M/W, Rm. 213
Lab: CRN 50087; Section M6A; 8:00 - 12:00 T/Th, Rm. 214

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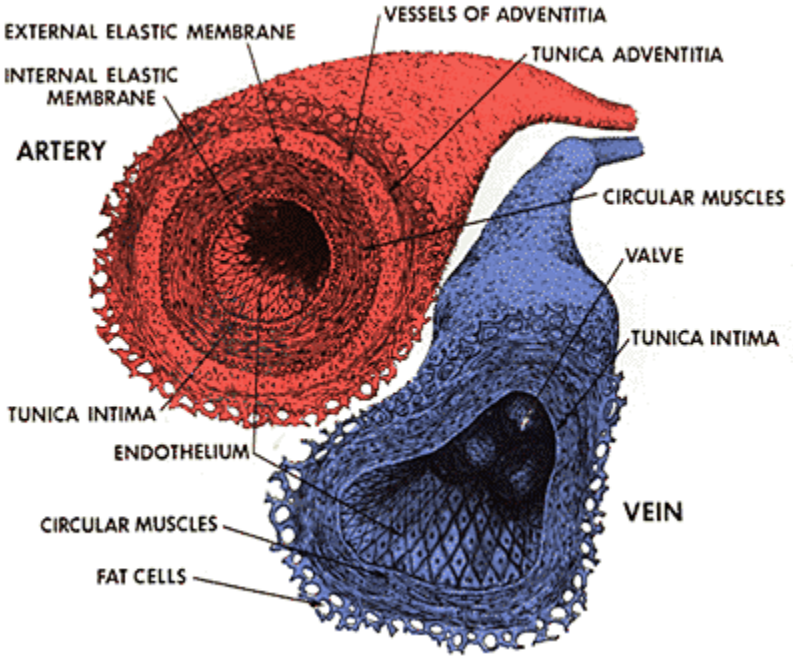

COURSE: BIO 212 - Anatomy & Physiology II is the second semester of a two semester sequence. Biology 211 - Anatomy & Physiology I must be taken prior to this course and completed with a grade of C. This is especially important if transferring to a four-year institution with a major requiring a full academic year of anatomy and physiology or if the student is enrolled in Three River's nursing program. BIO 212 presents the students with a lecture/laboratory study of endocrinology, reproduction, hematology, cardiovascular, respiratory, digestive, excretory systems, and acid- base balance.

CREDIT; 4 credit hours consisting of 10 contact hours of lecture and 6 hours of laboratory per week for a 6 week summer session.

REQUIRED TEXTS;

Fundamentals of Anatomy and Physiology by Frederic Martini and 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)

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

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 transferable laboratory science to satisfy the science requirements of Three River's LAS or GS Associate Degree.
2. To fulfill pre-requisite and co-requisite anatomy and physiology requirements for Three River's Nursing program, pre-dental hygiene and other nursing/allied health programs either here or at other institutions.
3. Provide students with an undergraduate level study of human body systems.
4. Provide students with a foundation for study of the medical, biological, or physical sciences.
5. Provide students with critical thinking and problem solving skills.
6. Demonstrate the biological sciences and how they relate to other disciplines.
7. Illustrate the interdependence of all life forms operating on natural laws with the physical environment.
8. 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 of class is required. Attendance is taken. Absences can be very detrimental due to the nature of the material. An explanation of all absences is very much appreciated, 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:

$$\text{percentage score} = \frac{\text{number of points you have accumulated on exams}}{\text{total number of points possible}} \times 100$$

C. Points are obtained by the following methods of evaluation:
1. Quizzes: Four quizzes worth 30 points each will be given on scheduled Fridays on line on the Course Compass website www.coursecompass.com Their content and times available will be announced in the announcement section of Course Compass and by email . Each will consist of 30 multiple choice questions worth two points each.
2. Major Exams: Two major exams of 100 points each will be given. Each will evaluate the student's knowledge over material given since the last major exam. They will consist of 50 multiple choice questions worth two points each.
3. Final Exam: A comprehensive final exam will be given on the last day of class. It will consist of 75 questions at 2 points each and worth 150 points. Fifty of the questions will cover material presented since the last major exam.
4. Extra Credit: There will usually be extra credit questions attached to the major exams. These will be essay questions having variable point value. In addition, extra points may be given from leaning modules on the ADAM Interactive Physiology CD that comes with your textbook. Details will be within the learning folders in the Assignment section of Course Compass.
5. Practical exams: Two 45-point lab identification exams over the dissection of the internal anatomy of the cat will be given. Lab practical exam #1 will be over the digestive and urogenital system chapters of lab unit II objectives and lab practical exam #2 will be over circulatory and nervous system chapters of lab unit II and also heart lab unit III-A objectives.
6. Lab reports: The following written reports will be required: cardiac anatomy (15 points), cardiovascular physiology (15 points), pulmonary function (15 points), and renal regulation of osmolarity (25 points).
7. Lab quiz: A 30 point lab quiz over the hematology lab exercise will be given.

D. Percentage contribution of each evaluation process to the overall lecture/lab score and to the overall grade:
1. Major exams (2): 15% each
2. Final exam: 23%
3. On-line quizzes (3): 4.5% each
4. Lab practical exams (2): 7% each
5. Cardiac anatomy lab report: 2.3%

6. Cardiophysiology lab report: 2.3%
7. Pulmonary function lab report: 2.3%
8. Renal regulation of osmolarity lab report: 4%
9. Lab quiz over hematology: 4.5%

E. Exam and quiz questions for lecture and/or laboratory material may consist of multiple choice, true/false, fill in the blank, matching, identification, or essay questions. Some questions might be reserved as an extra credit option.

F. Absence on examination days:

Students must take exams as scheduled.

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

1. Convert your total accumulated points into a percentage score (see above).
* *2. The final course grade is determined from the overall course percentage score related to the following percentage scale:

100% = A+*	78 - 79% = C+	*A+ cannot be reported to the registrar's office as an official grade
93 - 99% = A	73 - 77% = C	
90 - 92% = A-	70 - 72% = C-	
88 - 89% = B+	68 - 69% = D+	
83 - 87% = B	60 - 67% = D	
80 - 82% = B-	0 - 59% = F	

**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 DROPPING COURSE(S):

A student who finds it necessary to discontinue a course must complete a withdrawal form obtained from the Registrar's Office. Students may withdraw up to **Aug. 4th** in order to withdraw and receive a "W" grade for the course. Students who do not withdraw 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

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.

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

The following lecture learning units are within corresponding folders within the Assignment Section of Course Compass. Additional learning aids are also within those folders such as: reading assignments, dates, testing, computer programs within the lab, on-line learning aids from the textbook publisher, class notes and handouts, Internet links, and practice exam questions.

I. **Endocrinology**: study of control by endocrine glands
Upon completion of a study of the endocrine system, the student should be able to correctly answer questions concerning the following:

A. Describe the basic overall makeup of the endocrine system.
1. List and describe methods of intercellular communication [table 18-1, p. 592 (7^{th} ed) or p. 605 (8^{th} ed.)]
2. Define the following:

exocrine gland	feedback regulation
endocrine gland	tropic hormone
hormone	target cells

3. Describe the chemical structure groups hormones may be divided into: amino acid derivatives, peptides, lipid derivatives (fig. 18-2, p. 594 of 7^{th} ed. or p. 608 of 8^{th} ed).
4. Describe proposed mechanisms in which hormones initiate responses from target organ cells by discussing lipid solubility, receptor, G-protein, adenyl cyclase, cyclic AMP, protein kinases, phospholipase C, Ca^{++} (fig. 18-3 and 18-4, p. 597-598 of the 7^{th} ed or p. 610-612 of 8^{th} ed).
*5. Define prostaglandins and leukotrienes (p. 595 of 7^{th} ed or p. 607 of 8^{th} ed).
6. List the names and locations of the major endocrine glands (fig. 18-1, p. 593 of 7^{th} ed or p. 607 of 8^{th} ed)

B. Describe the anatomy and physiology of the pituitary gland.
1. Describe the anatomy of the pituitary and its relationship to the hypothalamus of the brain using the following terms:

sella turcica	infundibulum	median eminence
adenohypophysis	releasing and inhibiting factors	posterior pituitary
anterior pituitary	hypophyseal portal system	neurohypophysis

2. Describe the function and feedback control of the following adenohypophyseal hormones:
a. growth hormone (somatotropin)
b. gonadotropic hormones
1) follicular stimulating hormone
2) luteinizing hormone
c. prolactin (lactogenic hormone)
d. thyroid stimulating hormone
e. adrenocorticotropic hormone
*f. melanocyte stimulating hormone (p. 604 of 7^{th} ed. or p. 617-618 of 8^{th} ed)

***will not be covered in clas**

3. In reference to growth hormone, define somatomedins, glucose-sparing effect, and diabetogenic effect.
4. Describe the function and feedback control (if any) of the following neurohypophyseal hormones:
   a. oxytocin
   b. anti-diuretic hormone (vasopressin)
   c. Define: paraventricular and supraoptic nucleus, milk-let-down reflex, antiduresis, osmoreceptors, and hypothalamic-hypophyseal nerve tract
5. Know the normal plasma osmolarity level in milliosmols per liter

*6. Define:

dwarfism	diabetes insipidus	Cushing's disease
giantism	acromegaly	

C. Describe the anatomy and physiology of the thyroid gland.
1. State the location of the gland.
2. Describe the anatomy of the gland by discussing lateral lobes, pyramidal lobe, isthmus, follicles, follicular and parafollicular cells.
3. Discuss the functions and feedback control of thyroxin (T4), triiodothyronine (T3), and calcitonin.

*4. Describe the chemical formation of T3 and T4 (fig. 18-11, p. 609 of 7th ed or p. 622 of 8th ed).

*5. Define:

hypo-hyperthyroidism	exophthalmos
Grave's disease (thyrotoxicosis)	thyroglobulin
myxedema	radioactive iodine uptake
cretinism	goiter
thyroid storm	
protein-bound iodine (thyroxin-binding globulin)	

D. Describe the anatomy and physiology of the parathyroid glands.
1. Discuss the function of the feedback regulation of parathormone.

*2. Define hypo-hyperparathyroidism, hypo-hypercalcemia and state the abnormalities that result.

3. Know what the normal blood calcium ion concentration is.

E. Describe the adrenal (suprarenal) glands.
1. Describe the anatomy and physiology of the adrenal cortex.
   a. Describe the location of the gland and state the cellular layers (zonas) from superficial to deep and list which hormone groups are secreted by each.
   b. Describe the function and feedback regulation of aldosterone by describing the renin-angiotensin pathway.
   c. Know the normal blood sodium and potassium ion level
   d. State secretion site, function of, and control of natriuretic hormone.
   e. List the three major glucocorticoids, stating which is most abundant.
   f. List functions of and describe the feedback control of glucocorticoids. Be sure to relate stress and chronic inflammation to the above.
   g. Define:

*hypo-hypernatremia	mineralcorticoid
*hypo-hyperkalemia	glucocorticoids
*Addison's disease	gluconeogenesis
*Cushing's disease	gonadocorticoids

***will not be covered in class**

*virilism adrenocorticoids
*gynecomastia

2. Describe the suprarenal medulla (adrenal medulla).
   a. List the functions of epinephrine and norepinephrine.
   b. Define glycogenolysis, chromaffin cells, and sympathomimetic.
   c. Discuss the relationship between the adrenal medulla and the sympathetic nervous system.

H. Be able to discuss the endocrine functions of the Islets of Langerhans of the pancreas.
1. List the functions of insulin and glucogon and the type of cells that secrete them.
2. Describe the feedback control between insulin, glucogon, and blood glucose levels.
3. Be able to state what the normal blood glucose level is and the primary reason for its regulation.
4. Define:

alpha, beta cells	ketosis	hypo-hyperglycemia
diabetes mellitus I, II	acetic acid	glucosuria
glycogenesis	acetoacetic acid	ketones
glycogenolysis	acetone	ketonuria
acidosis	hyperinsulinism	polyuria

F. Discuss the endocrine functions of the testes. (p. 623 of 7th ed or p. 637 of 8th ed.)
1. List the functions of testosterone and inhibin.
2. Discuss the relationship of testosterone, FSH, and ICSH on spermatogenesis.
3. Define spermatogenesis, spermatogonia, interstitual cells of Leydig, and sustentacular cells.

G. Discuss the endocrine function of the ovaries. (p. 623 of 7th ed or p. 637 of 8th ed.)
1. List the functions and site of production of estrogens and inhibin.
2. List the functions and site of production of progesterone.

*H. Briefly describe the function of the hormone, melatonin, secreted by the pineal gland. (p. 616 of 7th ed. or p. 630-631 of 8th ed.)

*I. Describe the function of the hormones, leptin and resistin, secreted by adipose. (p. 624 of 7th ed. or p. 638 of 8th ed.)

*J. Describe the involvement of hormones with stress by discussing the alarm, resistance, and exhaustion phase. (pp. 626-628 of 7th ed. or pp. 640-642 of 8th ed.)

*K. Be aware of the affect of hormones on behavior. (pp. 628 of 7th ed or p. 642 of 8th ed.)

*L. Be aware pf the affects of hormones and athletic performance. (p. 629 of 7th ed or p. 643 of 8th ed.)

II. **Reproductive system:** Upon completion of a study of the reproductive system, the student should be able to correctly answer questions concerning the following:

A. Describe the male reproductive system.
1. Briefly describe the descent of the testes by defining the inguinal canal, spermatic cord, tunica vaginalis, gubernaculum, and cryptorchidism.
2. Define spermatic cord and be able to list its contents.

***will not be covered in class**

3. Describe the function of the scrotum by defining dartos and cremaster muscles.
4. Describe the structure and function of the testes and associated structures by defining:

tunica albuginea	sustentacular cells	testes
spermatogonia	tunica vaginalis	spermatogenesis
lobules	rete testes	spermatozoa
testosterone	seminiferous tubules	FSH
interstitual cells of Leydig	ICSH	meiosis
primary spermatocytes	secondary spermatocytes	spermatids

5. State parts and function of the epididymis, vas deferens, seminal vesicles, ejaculatory ducts, prostate gland, and bulbourethral glands.
4. Describe the anatomy of the penis and urethra by defining: prostatic, membranous, and penile urethra; corpora cavernosa, corpra spongiosum, glans, and prepuce.
5. Describe the composition of semen.

B. Describe the anatomy of the female reproductive system.
1. Describe the location and structure of the ovary.
   a. Organize the ovary into its layers using the following terms: tunica albuginea, stroma (cortex and medulla).
   b. Define oogenesis and differentiate between oogonium, primary oocyte, secondary oocyte, ovum, first and second polar body.
   c. Define follicles and differentiate between primordial, primary, secondary (growing), tertiary (mature or Graafian) follicles, follicular cells (thecal and granulosa).
   d. Define ovulation and corona radiata
   e. Define corpus luteum and corpus albicans.
2. State the purpose and location of parts (infundibulum, fimbriae, ampulla, and isthmus) of the fallopian tubes.
3. Locate and define the following parts of the uterus:

fundus	external cervical os
body	cervical canal
cervix	serosa
isthmus	myometrium
internal cervical os	endometrium

*4. Define anteflexion and retroflexion (pp. 1053 of the 7th ed. or p. 1065 in 8th ed.)
*5. Briefly describe the overall structure of the vagina and define Bartholin's glands (p. 1057-1059 of 7th ed. or p. 1070-1071 of 8th ed.).

*C Briefly describe the support for the female reproductive tract by defining: ovarian ligament, suspensory ligament, broad ligament (divided into mesovarium, mesosalphinx), uterosacral ligament, and round ligament.

D. Describe the female sexual cycle (menstrual).
1. State the purpose of the cycle.
2. List hormones involved in the regulation of the cycle.
3. Relate pituitary hormones, feedback regulation, and causes to the cyclic changes in ovarian and uterine structures. (link with objectives 4 and 5 below)
4. Describe the ovarian cycle by defining follicular phase, ovulation, luteal phase

***will not be covered in class**

5. Describe the uterine cycle by defining the menses, proliferative and secretory phase.
6. Describe the hormonal and structural changes in the cycle caused by fertilization. Describe the role of human chorionic gonadotropin.

*7. Define: menstruation, menarche, and menopause.

*E. Briefly describe fertilization and development by defining the following: fertilization, gestation, trimesters, cleavage, implantation, morula, blastocyst (with inner cell mass and trophoblast cells), gastrula (gastrulation), germ layers (ectoderm, mesoderm, and endoderm), placenta, extraembryonic membranes, embryo, fetus (pp. 1075-1082 of 7th ed. or pp. 1086-1095 of 8th ed.)

*F. Briefly describe the chorion, amnion, the basic structure of the placenta, and placental circulation. (1082-1085 of 7th ed. or 1095-1098 of 8th ed.)

III. **Cardiology:** study of the heart

Upon completion of a study of the heart, the student should be able to correctly answer questions concerning the following subject matter.

A. Describe the general path of circulation.
   1. Define: heart, arteries, arterioles, capillaries, veinules, veins, systemic and pulmonary circulation.
   *2. Compare the tissue structure of the different types of vessels. (pp. 709 – 717 of 7th ed. or pp. 720-729 of 8th ed.)

B. Be able to describe the anatomy of the heart using the following terms:

mediastinum	interventricular septum
pericardium (parietal & visceral)	atrial-ventricular septum
epicardium	apex
myocardium	base
endocardium	pulmonary trunk
right & left atria	aorta
right & left ventricle	vena cavas
interatrial septum	pulmonary arteries and veins
right & left AV valves	foramen ovale
aortic & pulmonary semilunar valves	ductus arteriosus
bicuspid & tricuspid valves	fossa ovalis
mitral valve	ligamentum arteriosum
coronary arteries (and major branches)	papillary muscle
coronary sinus	chordae tendonae

C. Trace the path of blood through the heart, naming chambers, valves, and major vessels (aorta & vena cavas) of the systemic and pulmonary circulation.

D. Describe how the heart muscle itself received nourishment by being able to trace the path of blood through the coronary circulation. Be able to do this by diagramming the following vessels: left and right coronary artery, anterior and posterior descending arteries, circumflex and marginal arteries, coronary veins, and coronary sinus.

E. Discuss the electrophysiology of the heart.
   1. Describe the electrical properties of cardiac muscle, using the following terms: working cells, pacemaker cells, automaticity, fast and slow channels, and plateau

***will not be covered in class**

2. Describe the location of conducting structures and trace the path of the electrical activity using the following terms:

SA node	Purkinje system
atrial myocardium	ventricular myocardium
AV node	resting & threshold potentials
AV bundle (of His)	refractory periods
Rt. and left bundle branches	AV delay

3. State why the SA node is the pacemaker.
4. State the purpose of the electrical conduction system described in objectives 2 and 3 above.
5. State why cardiac muscle will not go into tetanic contraction.
6. Define ectopic pacemaker. State what happens if the SA node is not the pacemaker and how the heart rate is affected by ectopic pacemakers.
7. Define heart block and ventricular escape.
8. In reference to the ECG, define:

p-wave	QRS interval
QRS complex	QT interval
t-wave	Eithoven's triangle
p-r interval	Eithoven's standard leads
s-t segment	

F. Describe the cardiac cycle and the pumping action of the heart.
1. Define systole and diastole.
2. Describe the pumping action of the atria and discuss the causes of the A, C, and V waves on the atrial pressure curve.
3. Describe the pumping action of the ventricles using:

period of rapid fill	period of isovolumetric relaxation
dicrotic notch	period of isometric (isovolumetric contraction)
period of ejection	afterload

4. State the cause of valvular opening and closing.
5. List the names and causes of the four heart sounds.

G. Discuss cardiac volumes
1. Define: end diastolic volume and state its normal amounts
   a. Define filling time, venous return and describe how they, along with the size of the heart affect end diastolic volume.
   b. Define cardiac reserve.
   c. Be able to calculate maximum heart rate, and relate it to filling time.
2. Define end diastolic volume and state its normal amounts.
3. Define stroke volume output and state its normal amounts
   a. If given EDV and ESV, be able to calculate stroke volume.
   b. Define preload, Starling's law, contractility, positive and negative inotropic agents, and afterload and describe how they affect stroke volume.
4. Define cardiac output and state its normal amounts.
5. If given stroke volume and heart rate, be able to calculate cardiac output.

H. Discuss mechanisms that control cardiac output.
1. Discuss factors that affect cardiac output by affecting venous return (intrinsic autoregulation flowchart)
2. Discuss reflex control by the autonomic nervous system using such terms as:

parasympathetic stimulation	cardioaccelerator	chemoceptors
sympathetic stimulation	cardioinhibitor	glossopharyngeal nerve

vagus nerves
greater cardiac nerves
baroceptors
norepinephrine
acetylcholine
tachycardia
carotid sinus
cardiac center
bradycardia

*G. Define the following:

ischemia
angina pectoris
myocardial infarction
murmur
myocarditis
cardiac arrhythmias
electrocardiogram
mitral valve prolapse
heart block
flutter
premature ventricular contraction (PVC)
endocarditis
cardiac tamponade
congestive heart failure
valvular insufficiency
valvular stenosis
fibrillation
balloon angioplasty
coronary thrombosis

*IV. **Anatomy of the Circulatory System:**

Upon completion of a study of the anatomy of the circulation system, the student should be able to correctly answer questions concerning the following subject matter.

A. State the origin, general location, and destination of the following major arteries:

aortic arch
ascending aorta
thoracic aorta
abdominal aorta
coronary
brachiocephalic
common carotid
external carotid
internal carotid
subclavian
vertebral
intercostal
phrenic
celiac
left gastric
hepatic
splenic
superior mesenteric
inferior mesenteric
suprarenal
basilar
Circle of Willis
thyrocervical trunk
internal thoracic
axillary
brachial
ulnar
radial
pericardial
bronchial
esophageal
renal
testicular or ovarian
common iliac
internal iliac
external iliac
femoral
popliteal
anterior tibial
posterior tibial

B. State the structures drained, general location, and destination of the following major veins:

cephalic
external jugular
internal jugular
basilar
ulnar
radial
axillary
brachial
subclavian
pericardial
azygos
brachiocephalic
internal iliac
anterior tibial
posterior tibial
great saphenous
inferior mesenteric
portal (hepatic)
hepatic portal system
superior mesenteric
superior vena cava
gastric and splenic
hepatic
suprarenal
renal
testicular or ovarian
inferior vena cava
common iliac
small saphenous
popliteal
femoral
external iliac

V. **Physiology of Circulation:**

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

A. Be able to describe the percentage of blood volume distribution within the different blood vessels

***will not be covered in class**

B. Discuss blood flow rates (perfusion) to different body structures at rest and at exercise.
   1. Correlate with metabolic rates and needs for oxygen and nutrients.
   2. Correlate with changing diameters of the blood vessels affecting perfusion rates.

C. Describe the physical factors causing blood flow.
   1. State the importance of blood flow (perfusion).
   2. Describe the causes of blood flow.
      a. Discuss the relationship of pressure gradients, elasticity of arteries and perfusion.
      b. Describe the relationship of resistance to perfusion by discussing viscosity and tube geometry.

D. Contrast blood flow in arteries, arterioles, capillaries, veinules, and veins according to resistance, construction, innervation, and velocity.

E. Discuss arterial blood pressure.
   1. Define pulse and pulse pressure.
   2. Define and be able to calculate mean blood pressure.
   3. Derive an equation for mean arterial pressure from the equation for perfusion.
   4. List factors that may alter arterial pressure by affecting cardiac output.
   5. Discuss factors affecting blood volume.
   6. Discuss factors which may affect arterial pressure by affecting peripheral resistance.
      a. Describe the vasomotor reflex
      b. Correlate blood volume and viscosity to blood pressure

VI. **Hematology:** study of blood

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

*A. List and describe the major functions of blood. (p. 640 of 7th ed. or p. 651 of 8th ed.)

B. Discuss the composition and functions of the major components parts of blood.
   1. State the quantity and the percentage of body weight made up of blood.
      a. Define and state normal hematocrit value.
      b. Define hypo- and hypervolemia.
   2. Describe the shape, size, life span, normal RBC count, and functions of the erythrocytes.
   3. Describe the leukocytes.
      a. State normal WBC and differential WBC count values.
      b. Organize leukocytes into granulocytes verses agranulocytes.
      c. Describe the anatomy, function, and site of production of neutrophils, eosinophils, basophil, monocytes, and lymphocytes.
      d. List and describe the properties of WBC, such as amoeboid movement, margination, diapedesis, chemotaxis, phagocytosis.
      e. In relation to WBCs, define the following:

PMN	*antigen-antibody complex	
poly	antigen	memory T-cells
bands	antibody	*tissue typing
cytotoxic T-cells	juvs	helper T-cells

***will not be covered in class**

B, T, & NK-lymphocytes	segs	fixed macrophages
plasma cells	suppresser T-cells	free macrophages

4. State normal numbers, site of production, and function of the platelets.
5. Be able to describe plasma.
   a. State the volume and percentage of blood composed of plasma.
   b. List the major chemical components of plasma.
   c. List, describe the function, and state production site of the major plasma proteins: albumen, globulins, and fibrinogen.
6. Describe hemoglobin.
   a. State the normal quantity of hemoglobin.
   b. Discuss the effect of age on hemoglobin production.
   c. List different forms of hemoglobin.
   d. State the major functions of hemoglobin.
   e. Describe the chemical structure of the hemoglobin molecule.

C. Describe the process of hematopoiesis.
1. Discuss the mesoblastic, hepatic, and myeloid stage of hematopoiesis.
2. List and discuss the sequence of erythrogenesis using the following: stem cell, hemocytoblast, proerythroblasts, erythroblast, normoblast, and reticulocyte.
3. List nutrients needed for adequate RBC formation and discuss the relationship between vitamin B12, intrinsic factor, and pernicious anemia.
4. Describe the role of erythropoietin.
5. In reference to iron metabolism, define: ferrous versus ferric iron, transferrin, apoferritin, ferritin, and hemosiderin.

D. Describe the process involved in the destruction of old erythrocytes.
1. State the major organs where old RBCs are destroyed.
2. Describe the sequence involved in the breakdown of hemoglobin using the following terms:

heme	bilirubin	stercobilin
globin	urobilinogen	liver
iron	urobilin	kidney
biliverdin	urochrome	jaundice

3. Describe the anatomy of the biliary tract.

* E. Describe the processes that protect us from infection (immunity and inflammation).
1. Define immunity. p. 764 (7th ed.); p. 777 (8th ed.)
2. Organize lymphocytes into their specific varieties and briefly state the function of each. pp. 768 (7th ed.); pp. 780-782 (8th ed)
3. List and know the basic location of lymphoid tissues such as: lymphoid nodules, tonsils, lymph nodes, thymus, and spleen. pp. 769-775 (7the ed.); pp. 783-788 (8th ed.)
4. Describe nonspecific defenses against disease.
   a. List physical barriers. pp. 775-777 (7th ed.); pp. 789 (8th ed)
   b. List and define varieties of phagocytes. Also define margination, diapedesis, chemotaxis, and adhesion. pp. 777-778 (7th ed.); pp. 789-791 (8th ed.).
   c. Describe inflammation. pp. 781-782 (7th ed) or pp. 793-796 (8th ed.), fig. 22-13
      (1) List the four local signs of inflammation.

***will not be covered in class**

(2) Describe the cells, chemicals, and steps involved in the inflammatory response.
(3) State the purpose (goals) of inflammation.

d. Briefly define other non-specific defenses such as: NK cells, complement, interferon, cytokines, fever, and pyrogens. pp. 778-780, 782 (7th ed) or pp. 791-793, 796 (8th ed.)

5. Define the following forms of immunity: innate, active (natural and induced), passive (natural and induced). p. 782-783 (7th ed.) or p. 796-797 (8th ed.)
6. Briefly describe the process of immunity.
   a. List and briefly describe the properties of immunity. pp. 783-784 (7th ed.) or pp. 797-798 (8th ed.)
   b. Briefly describe cell-mediated immunity by discussing T-cells (and their varieties), antigen presenting cells, and their interactions. pp. 784-789 (7th ed. or pp. 798-803 (8th ed.)
   c. Briefly describe humoral immunity by discussing B-cells (and their varieties) and antibody. pp. 789-792 (7th ed.) or pp. 804-807 (8th ed.)
   d. List and briefly define the five classes of antibody (immunoglobulin). p. 793 (7th ed) or p. 807-807 (8th ed.); table 22-1
   e. List and briefly discuss how antibodies destroy antigen. pp. 792 (7th ed.) or p. 807-808 (8th ed.)

F. Discuss the processes involved in hemostasis.
1. Define hemostasis.
2. List factors that prevent coagulation.
3. Define vascular spasm and platelet plug.
4. Discuss the intrinsic and extrinsic pathway for clot formation using the following terms:

clotting factors	thromboplastin
platelets	thrombin
calcium	fibrinogen
prothrombin	fibrin

prothrombin activator (prothrombinase)

5. Define serum, thrombus, embolus, streptokinase, tissue plasminogen activator (TPA)

G. Define the following miscellaneous hematology terms:

hematocrit	anemia	leukopenia
buffy coat	hypochromia	diff count
RBC count	hyperchromia	thrombocyte
polycythemia	WBC count	thrombocytopenia
oligocythemia	leukocytosis	megakaryocyte

VII. **Respiratory System:**

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

A. State the functions of the respiratory system.
B. List and define phases of respiration.
*C. Describe the anatomy of the respiratory system.
1. Describe the walls, contents, lining, and associated structures of the nasal

***will not be covered in class**

cavities. pp. 817-818 (7^{th} ed.) or pp. 829-830 (8^{th} ed.)

2. Describe the location, boundaries, and lining of the pharynx. p. 819 (7^{th} ed.) or p. 831 (8^{th} ed.)
3. Describe the anatomy of the larynx. pp. 819-820 (7^{th} ed.) or p. 831-833 (8^{th} ed.)
   a. List boundaries
   b. List functions.
   c. List and locate the cartilages of the larynx.
4. Describe the overall anatomy of the lungs by discussing the root, hilus, surfaces, lobes, and segments. pp. 823-824 (7^{th} ed.) or pp. 835-835 (8^{th} ed.)
5. Describe the location, boundaries, and construction of the trachea. p. 821-822 (7^{th} ed.) or p. 834 (8^{th} ed.)
6. Describe the organization of the bronchial tree by defining and stating numbers of primary, secondary, and segmental bronchi. pp. 824-826 (7^{th} ed.) or 834-837 (8^{th} ed.)
7. Describe the construction of the micro- airway tubes by defining: lobular, terminal, and respiratory bronchioles, alveolar duct, alveolar sac, and alveolus. pp. 826-828 (7^{th} ed.) or 837-841 (8^{th} ed.)
8. Describe the micro-anatomy and the significance of the alveolar-capillary membrane (respiratory membrane). pp. 826-829 (7^{th} ed.) or 837-841 (8^{th} ed.)

D. Describe the physiology of pulmonary ventilation.

1. List muscles used in normal and forced inspiration and expiration.
*2. Review the pleural cavity, fluid, and membranes. p. 829 (7^{th} ed.) or 841-842 (8^{th} ed.)
3. Define intrapleural, intra-alveolar , and ambient pressure.
4. Discuss factors that maintain a partial vacuum intra-pleural pressure.
   a. State the mechanism for gas absorption from the pleural cavity.
   b. State causes of elastic recoil of the lungs.
   c. Discuss the relationship between surfactant and surface tension.
5. Define compliance and airway resistance.
6. List sequence of events causing inspiration and expiration.
7. Define the various pulmonary volumes and capacities.
8. Define anatomical, alveolar and physiological dead space volume.
9. Define and be able to calculate minute respiratory and alveolar ventilation volume.
10. Describe the humoral and neural control of ventilation.
    a. Describe the Hering-Breuer reflex.
    b. Describe the effects of blood CO_2, O_2, and pH on neural control through peripheral and central chemoceptors.
    c. List the basic components of the respiratory center in the pons and medulla.

E. Describe the physiology of gas exchange.

1. Define Charles, Boyle's and Dalton's gas laws.
2. List factors affecting diffusion of gases.
3. Describe the composition of alveolar air and compare with atmospheric air.
4. Describe the diffusion of oxygen and carbon dioxide across pulmonary and systemic capillary walls.
5. State normal alveolar and venous pO_2, and pCO_2 values.
6. Know the normal "blood gas" concentration.
7. Define venous admixture.

***will not be covered in class**

F. Describe the physiology of gas transport by the blood.
   1. Discuss oxygen transport by reviewing oxyhemoglobin and by discussing the oxyhemoglobin dissociation curve and the effects of temperature and pH on it.
   2. Describe the Bohr effect.
   3. Define O_2 - hemoglobin saturation.
      a. Know the normal "O_2 sats" for both arterial and venous blood.
      b. If given an oxyhemoglobin dissociation curve and blood gas concentration, be able to determine O_2 sat level. If given the O_2 sat level, be able to determine the blood gas concentration (O_2).
   4. Briefly discuss oxygen transport in the dissolved state.
   5. Define carboxyhemoglobin
   6. Discuss carbon dioxide transport by:
      a. review carbaminohemoglobin
      b. List four methods of carbon dioxide transport and amounts carried by each.
      c. Define carbonic anhydrase and the chloride-bicarbonate ion shift.

VIII. **Digestive System:**

Upon completion of a study of the digestive system, the student should be able to correctly answer questions concerning the following: (Much of this material will be linked with the dissection in lab)

A. State the overall purpose of digestion. pp. 863 (7th ed.) or pp. 875-876 (8th ed.)
B. List the overall chemical breakdown processes for carbohydrates, lipids, protein, and nucleic acids. (see fig. 24-26 and table 24-2, pp. 903-904 of 7th ed. or pp. 917-918 of 8th ed.)
*C. Describe the overall anatomy of the G-I tract.
   1. List and state the purpose of the different types of teeth. p. 873-875 (7th ed.) or pp. 885-887 (8th ed.)
   2. State dentition of the deciduous and permanent teeth. p. 874 (7th ed.) or p. 887 (8th ed.)
   3. State the location, drainage, and type of saliva produced by the parotid, submaxillary, and sublingual glands. pp. 871-872 (7th ed.) or p. 884-885 (8th ed)
   4. Define mastication (chewing) and list muscles of mastication (temporalis and masseter).
   5. List and define the layers of the G-I tract wall as seen in cross section. pp. 866-868 (7th ed.) or 878-880 (8th ed.)
   6. Describe the location, purpose, mucosa and muscularis makeup of the esophagus. p. 875-876 (7th ed.) or p. 888-889 (8th ed.)
   7. Define the following areas and parts of the stomach: pp. 877-881 (7th ed.) or pp. 891-884 (8th ed.)

gastroesophageal junction	pyloric valve
cardia	rugae
fundus	gastric glands
antrum	-mucous cells
body	-parietal cells
curvatures (greater, lesser)	-chief cells
pylorus	

***will not be covered in class**

8. Describe the overall anatomy of the small intestine. pp. 884-887 (7th ed.) or pp. 898-901 (8th ed.)
   a. Describe the course of the duodenum.
   b. Define and locate the jejunum and ileum.
   c. Contrast the mucosa of the small intestine segments by defining: villi, Brunner's glands, central lacteal, and Peyer's patches.
9. Describe the biliary system. pp. 888-895 (7th ed.) or pp. 901-908 (8th ed.)
   a. List the lobes of the liver.
   b. List the major functions of the liver and gall bladder.
   c. Describe the drainage of bile from the liver by locating and defining: hepatic cystic, common bile ducts; ampulla of Vater, and sphincter of Oddi.
   d. Describe the overall location, parts, and drainage of the pancreas.
10. Describe the overall anatomy of the large intestine by defining and locating: pp. 896-901 (7th ed.) or pp. 910-915 (8th ed.)

ileo-cecal valve	ascending colon	sigmoid colon
splenic flexure	transverse colon	hepatic flexure
descending colon	cecum	rectum
appendix	haustra	

11. Define the following:

mastication	greater omentum	duodenal cap
deglutition	lesser omentum	duodenojejunal flexure
bolus	mesentery	peritoneum
chyme	mesocolon	

*D. Describe the overall physiology of the digestive system.
1. State the purpose of G-I tract secretions. p. 902 (7th ed.) or p. 916 (8th ed.)
2. List the chemical secretions and digestive action of saliva. pp. 872 (7th ed.) pp. 884-885 (8th ed.) and fig. 24-26 and table 24-3, pp. 903-904 (7th ed.) pp. 917-918 (8th ed.)
3. Describe the digestive functions of the stomach. pp. 879-880 (7th ed.) or pp. 891-894 (8th ed.)
   a. Describe the chemical mechanism of hydrochloric acid secretion by the parietal cells of the stomach. p. 881 (7th ed) or 894 (8th ed) and fig. 24-14
   b. Describe the chemical activation of pepsinogen into pepsin and the digestive function of it on protein molecules. p. 880 (7th ed.) or p. 894 (8th ed.) and fig. 24-26 and table 24-3
4. List the digestive secretions of the pancreas and the digestive actions of each. p.889 (7th ed.) or p. 902-903 (8th ed.) and fig. 24-26 and table 24-3
5. Describe the effect of the hormone, cholecystokinin on the ball bladder. p.894-895 (7th ed.) or 908-909 (8th ed.)
6. State the purpose of bile. p. 894 (7th ed.) or p. 908 (8th ed.)
7. List the digestive secretions of the small intestine and the digestive actions of each. fig. 24-26 and table 24-3
8. Describe the basic absorption of nutrients. pp. 903-907 (7th ed.) or pp. 918-921 (8th ed.)
9. State the digestive and absorption functions of the large intestine. p. 899-900 (7th ed.) or pp. 913-914 (8th ed.)
10. Describe basic movements of the G-I tract.
    a. Define segmentation and peristalsis. pp. 868 (7th ed.) or pp. 880-881 (8th ed.)

***will not be covered in class**

b. Define enterogastric reflex and defecation. pp. 883, 863, fig.24-25; p.901 (7th ed.) or 896, 876, fig. 24-25; p. 915 (8th ed.)
c. Define gastrin and secretin. pp. 880, 883, 895-896 (7th ed.) or pp. 894, 897, 909-910 (8th ed.)

***will not be covered in class**

IX. **Excretory System:**

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

A. List the functions of the excretory system.
B. Locate and describe the fixation and shape of the kidneys.
C. Describe the internal anatomy of the kidneys.
   1. Locate the following: capsule, hilus, cortex, medulla, pyramids, columns, calyx, and pelvis.
   2. Describe the structure of the nephron.
   3. Describe the blood supply to the kidneys and nephrons within.
D. Describe the course of the ureters.
E. Describe the overall anatomy of the urinary bladder by defining trigon, urethra, internal and external urethral sphincters.
F. Describe the basic physiology of micturition.
G. Describe the physiology of urine formation.
   1. Discuss the dynamics of glomerular filtration.
      a. Define glomerular filtration.
      b. State the cause of glomerular filtration.
      c. State composition of glomerular filtrate.
      d. State regulation of glomerular filtration rate and its effect on urine formation.
   2. Describe tubular reabsorption.
      a. Define tubular reabsorption.
      b. State the quantity of glomerular filtrate that is reabsorbed.
      c. State which chemical substances are reabsorbed.
      d. Describe the basic mechanism for the reabsorption of an ionic and a non-ionic chemical substance using NaCl and glucose as examples.
      e. Describe the counter-current mechanism for producing a dilute or concentrated urine by discussing osmolarity changes associated with the loop of Henle and the mechanism of ADH.
      f. Describe how the kidneys regulate the normal plasma concentration of sodium, potassium, and calcium ions through tubular reabsorption controlled by the hormones aldosterone and parathormone.

X. **Acid-Base Regulation:** Upon completion of a study of acid-base regulation, the student should be able to correctly answer questions concerning the following:

A. State normal range for blood pH and extreme ranges for acidosis and alkalosis.
B. List three defense mechanisms for controlling body fluid pH.
C. List and discuss acid-base buffers within body fluids.
   1. Define buffer.
   2. Using the Henderson-Hasselbach equation, demonstrate the dynamics of the carbon dioxide-bicarbonate ion buffer system.

3.List other chemical buffers within the body fluids and relate their buffering power compared to the carbon-dioxide-bicarbonate ion buffer system.

D. Describe how the respiratory system regulates pH.
   1. Discuss effects of hydrogen ion concentration on alveolar ventilation and visa versa.
   2. Relate the buffering power of the respiratory system to that of chemical buffers of the body fluids.

E. Describe how the kidneys regulate pH.
   1. Describe tubular secretion of hydrogen ions.

*F. Define and list causes of: respiratory acidosis, respiratory alkalosis, metabolic acidosis, and metabolic alkalosis.

***will not be covered in class**

SPECIFIC OBJECTIVES FOR THE LABORATORY PORTION OF THE COURSE

I. **Renal Regulation of Osmolarity of Body Fluids Experiment Lab:** The student will correctly complete a class experiment demonstrating how the kidneys regulate osmolarity of body fluids and complete a laboratory report describing the experiment and answering questions.

II. **Internal Anatomy of the Cat:** Upon completion of a dissection of the internal anatomy of the cat, the student should be able to correctly identify the following structures during a laboratory practical exam.

Chapter: "Digestive System"

lymph nodes
parotid gland
parotid duct
submaxillary gland
submaxillary duct
sublingual gland
incisors
canines
premolars
molars
papillae of tongue
frenulum of tongue
hard palate
soft palate
thyroid cartilage, arytenoid cartilage
vocal cord
thyroid gland
trachea
pleural cavity
cerebellum
cerebrum
hypophysis (pituitary gland)
medulla
pons
nasal choncha
internal nares
palatine tonsils
pharynx
larynx
glottis
epiglottis
cricoid cartilage
jejunum
ileum
cecum
ascending colon
transverse colon
descending colon

mediastinum
parietal & visceral pleura
anterior, middle, & posterior lobes of lungs
bronchi
pericardium
pericardial cavity
heart
thymus gland
root of lung
parietal & visceral peritoneum
peritoneal cavity
greater omentum
omental bursae
gastrosplenic ligament
lesser omentum
gastrohepatic ligament
hepatoduodenal ligament
spleen
epiploic foramen
mesentery
mesoduodenum
duodenum
stomach
fundus of stomach
cardiac orifice
pyloric valve
rugae
rectum
mesocolon
right medial & lateral liver lobe
left medial & lateral liver lobe
caudate liver lobe
gall bladder
cystic duct
hepatic duct
common bile duct
falciform ligament
diaphragm
central tendon of the diaphragm
**celiac artery
**hepatic artery
**gastric artery
**splenic artery
**superior mesenteric artery
**portal vein (hepatic portal vein)
**superior mesenteric vein
**gastrosplenic vein
greater & lesser curvature of stomach
ileocecal valve
pancreas
ampulla of Vater
pancreatic duct
body of stomach
pylorus of stomach
esophagus

**to be identified on the second lab practical exam with the circulatory system

Chapter: "Urogenital System"

kidneys
adrenal gland
hilus of kidney
ureter
urinary bladder
urethra
penis
scrotum
testes
spermatic cord
inguinal canal
mesosalpinx
uterine horns
body of uterus
vagina
mesometrium
broad ligament
internal & external inguinal ring
ductus deferens (vas deferens)
prostate gland
bulbourethral gland
epididymus
ovaries
mesovarium
ovarian ligament
Graffian follicles
corpus luteum
fallopian tube
abdominal ostium (infundibulum)
fimbrae
cervix
urethral orifice
labia majora
clitoris

Chapter "The Circulatory System"

pulmonary artery
pulmonary veins
precava (superior vena cava)
internal & external jugular veins
intercostal veins
internal mammary veins
innominate veins (brachiocephalic)
subclavian veins
axillary veins
brachial vein
aorta (ascending, arch, thoracic, abdominal)
innominate artery (brachiocephalic)
inferior mesenteric artery
ovarian or spermatic vein
external iliac artery
popliteal artery
left & right subclavian artery
left & right common carotid artery
internal & external carotid artery
internal mammary artery
vertebral artery
axillary artery
brachial artery
intercostal arteries
celiac artery
superior mesenteric artery
renal arteries
spermatic (testicular) artery
ovarian artery
postcava (inferior vena cava)
hepatic vein
femoral artery
femoral vein

Chapter "Nervous System"

meninges
-dura mater
-arachnoid mater
-pia mater
cerebrum
gyrus
sulcus
fissure
corpus callosum
lateral ventricle
cerebellum
pons
medulla
spinal cord
facial nerve
cervical plexus
brachial plexus
phrenic nerve
vagus nerve
lumbosacral plexus
femoral nerve
sciatic nerve
sympathetic ganglia (trunk)

III. **Anatomy of the Heart Lab**: Upon completion of a dissection of a heart, the student should be able to complete a lab practical exam.

A. Complete a dissection of a heart and be able to identify the following heart structures on a lab practical exam.

parietal pericardium
visceral pericardium
pericardial space
epicardium
myocardium
endocardium
right and left atria
right and left ventricles
bicuspid valve
pulmonary valve
aortic valve
interventricular septum
superior and inferior vena cava
aorta
pulmonary artery
pulmonary veins

tricuspid valve	coronary arteries
papillary muscles	chordae tendonae

IV. **Cardiovascular Physiology Lab**:
Upon completion of a lab exercise, the student should be able to complete a lab report concerning the following:

A. Record an electrocardiogram, and from the tracing, be able to:
1. identify p, qrs, t-waves, and s-t segment
2. determine the p-r interval
3. determine the heart rate

B. Record the pulse wave and on it identify the dicrotic notch.
C. Listen to heart sounds, identifying S1 and S2 and the valves making the sound.
D. Obtain a blood pressure

V. **Hematology Lab:** Upon completion of a laboratory study of blood, the student should be able to correctly answer questions concerning the following and have completed the following:

A. The student is to complete the following complete blood count (CBC) tests:

wbc count	hemoglobin determination
differential wbc count	hematocrit
rbc count	

B. The student is to determine blood glucose concentration, sedimentation rate, blood type (ABO and Rh), and calculate estimation of blood volume, total O_2 carrying capacity, mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), and mean corpuscular hemoglobin content (MCHC).
C. The student should be able to interpret results, define hematology terms given in this lab, and describe the basic methods used for analysis.

VI. **Anatomy of the Kidney Lab:**
A. Upon completion of a dissection of a kidney, the student should be able to correctly identify the following:

renal capsule	cortex
renal artery	pyramid
renal vein	papillae
ureter	pelvis
hilus	calyx

B. Perform a routine urine analysis composed of a basic physical, chemical, and microscopic exam.

VII. **Respiratory Physiology Lab**: Upon completion of gathering data from respiratory physiology experimentation, the student should be able to correctly complete a lab report containing the following:
A. Data from the following pulmonary function tests using a spirometer:

tidal volume	daily pulmonary ventilation

expiratory reserve volume	maximal breathing capacity
inspiratory reserve volume	forced expiratory volume (l sec.)
vital capacity	minute respiratory volume

B. Data from exercises demonstrating neural and humoral control of pulmonary ventilation.
C. Upon completion of the exercise, the student will also correctly answer examination questions concerning the following:
   1. Definitions of lung volumes and capacities.
   2. Neural and humoral control of respiration.
   3. Definitions of respiratory terms listed in the laboratory exercise.

COURSE OUTLINE: BIO 212 - HUMAN ANATOMY & PHYSIOLOGY II

I. Endocrinology

A. Hormonal action and control
B. Hormones, function, control, structures, and disorders of endocrine glands
   1. Adenohypophysis
   2. Neurohypophysis
   3. Thyroid
   4. Parathyroid
   5. Adrenal cortex
   6. Adrenal medulla
   7. Testes
   8. Ovaries
   9. Pancreas

II. Reproductive system

A. Male reproductive system
B. Female reproductive system
C. Female reproductive cycle
D. Fertilization and development

III. Cardiology

A. General path of circulation
B. Anatomy of the heart
C. Path of blood flow through the heart
D. Electrophysiology
E. Pumping action and cardiac cycle
F. Control of cardiac output

IV. Circulation

A. Major systemic arteries
B. Major systemic veins

C. Physiology of circulation
    1. Physics of blood flow
    2. Blood pressure

V. Hematology

A. General functions and characteristics of blood
B. Formed elements
    1. Erythrocytes
        a. characteristics; Lab values
        b. hemoglobin
        c. formation of
        d. iron metabolism
        e. destruction of
    2. Leukocytes
        a. characteristics; Lab values
        b. role in immunity and inflammation
    3. Platelets
C. Plasma
D. Hemostasis
E. Immunity

VI. Respiratory system

A. Functions and overview
B. Anatomy of the airway
C. Pulmonary ventilation
D. Gas exchange
E. Gas transport

VII. Digestive system

A. Purpose and overview
B. Chemical hydrolysis of food
C. Anatomy of the G-I tract and accessory structures
D. Biliary system
E. G-I motility
F. Secretion and absorption

VIII. Excretory system

A. Functions and overview
B. Chemicals excreted
C. Macro and microscopic anatomy of the kidneys
D. Urinary tract
E. Urine formation
F. Renal regulation of fluid and electrolytes

IX. Acid-Base Balance

A. pH and normal ranges
B. Regulatory mechanisms
1. Acid-base buffers
2. CO_2 - bicarbonate ion ratio
3. Respiratory regulation
4. Renal regulation
C. Metabolic and respiratory acidosis/alkalosis

BIO 212: ANATOMY & PHYSIOLOGY II

TENTATIVE ACADEMIC SCHEDULE

Summer Semester, July 1 – August 11, 2008

Tues. July 1: Unit I: Endocrine System: Hormonal function, anterior pituitary gland, room. 213
Wed. July 2: Posterior pituitary and thyroid function, room. 213
Thur. July 3: 8:00-9:00; Parathyroid function; 9:00-12:00 Renal Regulation of Osmolarity Lab Experiment, room 214

Mon. July 7: Adrenal glands, Islet cells of pancreas; Unit II: Reproductive system; male; room 213; **On-line Quiz#1 on Coursecompass.com**
Tues. July 8: Dissection; Internal Anatomy of the Cat; room 214
Wed. July 9: Female reproductive system; Unit III: Cardiology; room 213
Thur. July 10: **8:00-9:00 Exam #**1 in room 305; 9:00-12:00; Dissection (cont). room 214

Mon. July 14: Cardiology unit (continued), room 213
Tues. July 15: **8:00-9:00 Lab Practical Exam #1**; 9:00-12:00; Dissection (con't); room 214
Wed. July 16: Cardiology (continued), room 213
Thur. July 17: 8:00-11:00; Pig heart and cat dissection followed be a video of open heart surgery from 11:00-12:00; all in room 214
Fri. July 18: **On-line Quiz#2 on Coursecompass.com**

Mon. July 21: Finish Cardiology unit; Unit V: Physiology of circulation and blood pressure, room 213
Tues. July 22: **8:00-9:00 Lab Practical Exam #2;** 9:00-11:00 Cardiovascular physiology lab exercise, all in room 214; 11:00-12:00; Unit VI: Hematology in room 213
Wed. July 23: Unit VI: Blood (continued), room 213
Thur. July 24: **8:00-9:00 Exam #2** in room 213; 9:00-12:00 Hematology Lab in room 214

Mon. July 28: Blood (continued) and Immunity; room 213
Tues. July 29: 8:00-10:00 Unit VII: Respiratory System, room 213; 10:00-12:00 Hematology lab exercise (continued) in room 214
Wed. July 30: Pulmonary Ventilation in room 213
Thur. July 31: **8:00-8:45 Hematology lab quiz;** Renal Anatomy lecture/lab followed by urine analysis lab, all in room 214
Fri. Aug. 1: **On-line Quiz#3 on Coursecompass.com**

Mon. Aug. 4: Gas exchange and gas transport followed by Unit VIII: Digestive system, room 213
Tues. Aug. 5: 8:00-9:00 Digestive system (continued) in room 213: 9:00-12:00 Pulmonary Function Lab Exercise in room 214
Wed. Aug. 6: Digestive system (continued) followed by Unit IX: Renal physiology, room 213
Thur. Aug. 7: Renal physiology (continued), Unit X: Acid/Base Balance, room 213
Fri. Aug. 8: **On-line Quiz#4 on Coursecompass.com**

Mon. Aug. 11: **Final Exam**

TOPIC ORDER AND TEXTBOOK READING

Unit I: *Martini; Endocrinology; chapter 18;
Unit II: Martini; Reproductive system; chapter 28 and pp. 1075-1091 (7^{th} ed.) or pp. 1087-1103 (8^{th} ed)
Unit III: Martini; Heart, chapter 20;
Unit IV: Martini; Anatomy of the Blood Vessel and Circulation Routes; 709-718 (7^{th} ed.) or pp. 720-729 (8^{th} ed.);
Unit V: Martini; Physiology of Circulation; pp. 718-758;
Unit VI: Martini; Hematology: chapter 19 and 22;
Unit VII: Martini; Respiratory system; chapter 23;
Unit VIII: Martini; Digestive system; chapter 24;
Unit IX: Martini; Excretory system; chapter 26;
Unit X: Martini; Acid-Base Balance; pp. 1007-1019 (7^{th} ed.) or pp. 1023-1036 (8^{th} ed.);

**Fundamentals of Anatomy & Physiology*, by Martini, Prentice Hall Publishers, 7th ed.

Dissection Labs: **Gilbert: Digestive/respiratory chapter, Urogenital chapter, circulation chapter, and Nervous system chapter

***Pictorial Anatomy of the Cat*; by S. Gilbert; University of Washington Press.