Course Objectives:

The student should be able to:

**COGNITIVE:**
1. Define anatomy and physiology and the principle of complementarity.
2. Define and use the common directional (Table 1.1) and regional terms (Fig. 1.7).
3. Name and define the planes (Fig. 1.8) and cavities (Fig. 1.9) of the body.
4. Define homeostasis, and be able to evaluate how positive and negative feedback are used to maintain homeostasis.
5. Define diffusion, osmosis, filtration, dialysis, hypertonic, hypotonic, and isotonic, and be able to apply this knowledge to new situations.
6. Name the different levels of structural organization, and identify the interrelationships between them.
7. List characteristics necessary to maintain life and list survival needs.

**MANIPULTAIVE:**
1. Demonstrate the anatomical position.

Course specific learning guide:

**TISSUES**
**Cognitive**
1. Name four (4) primary tissues and cite one (1) specific example of each (i.e., simple squamous epithelium).
2. Classify epithelial tissue.
3. List the structural and functional characteristics of epithelial tissue.
4. Draw the shape that characterizes each of these cell types: squamous, cuboidal, and columnar.
5. Distinguish between simple epithelium, stratified epithelium, and pseudostratified epithelium.
6. Distinguish between endocrine and exocrine glands, and unicellular and multicellular exocrine glands.
7. List three (3) types of exocrine glands as classified by their mode of secretion, tell how each type functions, and give an example of each type.
8. List the structural and functional characteristics of connective tissue.
9. Distinguish between endocrine and exocrine glands, and unicellular and multicellular exocrine glands.
10. Cite structural differences between bone and cartilage, and predict the implications for tissue repair in each tissue.
11. Compare and contrast the three (3) types of muscle tissue based on structure, location, and function.
12. List the structural and functional characteristics of nervous tissue.
13. Cite tissues that do and do not regenerate in a mature person.
14. Outline the process of tissue repair for a superficial wound.
15. List the embryonic origin of each tissue class.
16. List tissue changes that occur with aging.

INTEGUMENTARY SYSTEM
Cognitive
1. List four (4) body structures that make up the integumentary system.
2. Name two (2) major layers that compose the skin and the function(s) of each.
3. List the layers of the epidermis of the skin, beginning with the deepest layer, and list the cellular changes that occur in each layer.
4. Cite three (3) factors responsible for skin color, and state which is/are long term or short term.
5. Name two (2) layers that compose the dermis, and indicate the characteristics of each layer.
6. List the functions of the integument, and propose how each of these aids or interferes with the skin’s role in maintaining homeostasis.
7. List the physiological consequences of a third degree burn.
8. List the major types of skin cancer.
9. List the changes that occur as the skin ages.

SKELETON
Cognitive
1. List the functions of the skeleton.

Manipulative
1. Draw and label a diagram of the gross and microscopic anatomy of long bones.

Cognitive
1. Compare compact and spongy bone.
2. List the bone markings (Table 6.1, p.179), their description, and function.
3. Compare the inorganic and organic components of bone.
4. List and define the major kinds of bones in the human skeleton.
5. List the events of intramembranous and endochondral bone development.
6. Distinguish between the axial and appendicular skeleton, and know the components of each.
7. State the factors that influence bone growth and remodeling.
8. Distinguish between the types of fractures (Table 6.2), and indicate how fractures are repaired.
9. Evaluate the effects of osteoporosis, osteomalacia, and Paget's disease on bones.
10. State two (2) especially useful criteria for classifying body joints.
11. Name and distinguish between the three (3) types of fibrous joints, and give an example of each.
12. Name and distinguish between the two (2) types of cartilaginous joints, and give an example of each.
13. List the distinguishing features of synovial joints.
14. Name the six (6) types of synovial joints, and give examples of each.
15. Cite the main functions of ligaments.
16. List common joint injuries.

Manipulative
1. Demonstrate flexion, extension, dorsiflexion, plantar flexion, abduction, adduction, circumduction, rotation, supination, pronation, inversion, eversion, protraction, retraction, elevation, depression, and opposition.

MUSCLE
Cognitive
1. List the ways in which muscles are classified, give an example of each type, and list the functions of muscle.
2. Tell the gross structure of skeletal muscle and the connective tissue coverings and attachments.
3. Diagram and label a sarcomere.
4. List the sequence of events in the excitation, contraction, and relaxation of the skeletal muscle.
5. Define a motor unit and how muscles are stimulated.
6. Distinguish between isometric and isotonic skeletal muscle contractions.
7. Name the distinct phases that occur in a skeletal (single) muscle twitch, and indicate the cellular events during each phase.
8. State the all-or-none principle as it applies to muscle.
9. List the sources of ATP used during muscle contraction and the adaptations of different types of skeletal muscle for gaining maximum ATP.
10. Diagram the relationship between the muscle events and the circulatory system that summarizes the mechanisms for providing ATP to skeletal muscles.
11. Compare and contrast the three (3) types of skeletal muscle fibers, and list the kinds of activities which utilize each.
12. Distinguish between the following characteristics of muscle physiology: treppe, independent irritability of muscle, subthreshold, threshold, suprathreshold, graded muscle response, summation, incomplete tetanus, complete tetanus, fatigue, and load. Diagram a sample laboratory tracing that is representative of each.
13. List the functional differences between unitary smooth muscle, multiunit smooth muscle, skeletal muscle, and cardiac muscle.
14. Compare and contrast smooth and skeletal muscle microscopic anatomy.
15. Compare and contrast smooth and skeletal muscle contraction.
NERVOUS SYSTEM
Cognitive
1. Name the parts of a reflex arc, and differentiate between stretch, flexor, and crossed extensor reflexes.
2. List the levels of organization in the nervous system (Fig. 11.2) and their functions.
3. Distinguish between the somatic nervous system and the autonomic nervous system, and cite the principle function of each.
4. Name the types of neuroglia in the CNS and PNS, and state the functions of each.
5. Diagram and label a neuron, and indicate the function of each part.
6. Distinguish and define the neuron based on their structural classification and functional classification.
7. Define the resting membrane potential and the physiological characteristics that create it.
8. List the cellular changes that occur during each phase of an action potential. Draw and label an action potential.
9. Compare graded potentials and action potentials.
10. Define the all-or-none response as it applies to the neurons.
11. Compare the absolute refractory period and the relative refractory period.
12. Indicate why a nerve impulse travels faster in a myelinated neuron than in a neuron that is unmyelinated.
13. List the events involved in transmitting an impulse in a nerve-nerve chemical synapse.
14. Distinguish between temporal summation and spatial summation.
15. Distinguish between an end plate potential (EEP), and excitatory postsynaptic potential (EPSP), and an inhibitory postsynaptic potential (IPSP).
16. List the common examples of neurotransmitters found in humans, and for each, indicate the division of the nervous system in which it is used, and give a response resulting from the use of the transmitter.
17. List the parts of the brain and the structural and functional relationship of the parts.
18. List the meninges that surround the brain and spinal cord.
19. List the major spinal plexuses and body regions supplied by each.
20. Identify how cerebrospinal fluid is produced and the pathway of circulation of the cerebrospinal fluid.
21. Identify the structure of the spinal cord and the functions of the spinal cord.
22. Name the twelve (12) pairs of cranial nerves in order from anterior to posterior, and their function and whether they are sensory, motor, or both.
23. Compare the sympathetic and parasympathetic nervous systems and the functions of each.
24. List the events that happen to the body in a fight or flight situation.

ENDOCRINE AND REPRODUCTIVE SYSTEM
Cognitive
1. List the major endocrine glands, the hormones they produce, and their functions.
2. Distinguish between circulating and local hormones, and list the mechanisms hormones use to alter cell activity.
3. List the general factors that determine blood concentration of hormones, and give one (1) specific example.
4. Diagram the second messenger mechanisms of hormone action using a specific example. List the steps of steroid hormone action and give a specific example of a steroid hormone.
5. Diagram how the nervous system and the anterior and posterior pituitary are integrated using an example that integrates all three.
6. Use negative feedback as it relates to endocrine control.
7. Compare the hormonal, ovarian, and uterine events that occur during the menstrual cycle.
8. List the physiological events during the sexual response in human males and females.
9. List the path sperm travels from the male into the female, and the usual place where fertilization occurs and where the fertilized egg implants.
10. List the physiological changes resulting in menopause.

CIRCULATORY SYSTEM
Cognitive
1. List the principle functions of the blood.
2. List the important plasma proteins and formed elements of the blood, and cite the function of each.
3. Diagram the hemostatic mechanisms that occur following vessel damage.
4. Distinguish between the intrinsic and extrinsic clotting mechanisms.
5. Summarize the events of clot retraction and the anticlotting system.
6. Diagram the non-specific local inflammatory response to bacterial infection.
7. Diagram how blood enters the heart, circulates through it, and then exits.
8. Tell the mechanical actions that produce the normal heart sounds, “lub-dub”.
9. Tell the sequence of the conduction system through the heart.
10. Distinguish between the function of the sinoatrial node and the atroventricular node.
11. List the events of the cardiac cycle; draw and label an ECG.
12. State how cardiac output is determined and do a diagram to show how physiological changes alter cardiac output.
13. List the factors that influence the resting heart rate.
15. Tell Starling’s law of the heart.
16. Distinguish between bradycardia and tachycardia, and the conditions called flutter and fibrillation.
17. Trace the flow of a drop of blood anywhere in the body.
18. Diagram and label the action potential for cardiac muscle, and identify the distinguishing cellular events of the cardiac action potential.
19. List the structure, characteristics, and function of lymphatic vessels.
20. Identify the source of lymph and the mechanisms supporting its transport in the body.
21. Identify the components and structure of lymphoid tissue and the major lymphoid organs.
22. Identify the location, structure, and function of lymph nodes.

DIGESTION
Cognitive
1. List the principal components of the digestive system, and cite the chief function(s) of each.
2. List four (4) accessory digestive organs, and cite the function(s) of each.
3. List the types of permanent teeth based on function.
4. Draw and label a typical canine tooth and predict problem areas.
5. List the tissue layers that make up the wall of the digestive system and the general functions of each of the layers.
6. Tell what happens to a meal from consumption until it has passed through the gastrointestinal tract and the residue leaves via the anus, including all the enzymes and other additions and what monomers the polymers are broken into so they can be absorbed. You will need to include teeth, all the additions and their functions, the factors that increase or decrease motility or secretions in any segment of the gastrointestinal tract.
7. Diagram the absorptive and post absorptive state, and indicate how they differ.
with regard to the primary energy source for the body.

URINARY SYSTEM

Cognitive
1. Name the components of the urinary system, and state the function(s) of each.
2. Draw and label the gross anatomical structure of the kidneys and the anatomical structure of nephrons with the associated circulatory elements.
3. Differentiate between the processes of filtration, tubular reabsorption, and tubular secretion that occur within the nephrons.
4. List the events in the nephron during the countercurrent urine concentrating mechanism.
5. Identify the mechanism for the regulation of body sodium.
6. Tell how water intake and outflow are regulated.
7. Tell how body potassium is regulated, and cite the regulatory factors involved.
8. Diagram calcium regulation.
10. Predict how the body will respond to salt and water loss due to diarrhea.

RESPIRATION

Cognitive
1. Name the general phases of respiration, and state what occurs during each phase.
2. Trace the route of a given volume of air from the time it is inhaled through the nose until it enters the lungs, and name the various structures through which it passes.
3. Indicate the functions of the respiratory passages.
4. Identify the process by which gas exchange occurs between the blood and body tissues, and how O2 and CO2 are transported in the blood.
5. State the effects of hydrogen ion concentration, carbon dioxide concentration, and temperature on the binding of oxygen by hemoglobin.
6. Distinguish between cyanosis, hypoxia, and carbon monoxide poisoning by stating physiological effects of each.
7. Tell the role of the medulla inspiration and expiration.
8. Tell the influences of PO2, PCO2 and pH on respiration rate.
9. Distinguish between inspiration and expiration by describing the mechanics of each.
10. Tell why the partial pressure of O2 and CO2 in the lungs differs from atmospheric pressure.
11. Define tidal volume, expiratory reserve, inspiratory reserve, residual volume, vital capacity, and total lung capacity.

Laboratory Objectives Biology 260
The student will be able to:

(MANIPULATIVE)
1. Focus a microscope, find and identify a tissue and specific structures using prepared slides.
2. Manipulate equipment to perform physiological measurements and experimentation and analyze the data collected.
3. Prepare graphs of data collected in the laboratory.
4. Manipulate a computer to acquire and analyze information.
5. Manipulate computer programs to locate and identify human anatomical structures.
6. Identify and dissect specified cat muscles.
7. Dissect and identify specified anatomical parts of sheep brains, pig hearts and cow eyes.
8. Dissect and identify the cat viscera and blood vessels.
9. Build specific human musculature with clay on a Maniken model.
10. Perform a long term physiological study which will include doing background library research, collecting the experimental data, analyzing the data, and preparing a scientific paper.

(COGNITIVE)
1. Identify prospected muscles, viscera and blood vessels on a human cadaver.
2. Apply anatomical terminology when describing the location of a structure in the human body.
3. Apply the knowledge of anatomical structures to visualize the regional integration of those structures.

Course Outline:
LECTURE OUTLINE  One hour and half sessions
   I. Introduction/Tissues
   II. Tissues/Integument (2 sessions)
   III. Skeleton (2 sessions)
   IV. Muscle (3 sessions)
   V. Nervous System (5 sessions)
   VI. Endocrine System (3 sessions)
   VII. Reproductive System (2 sessions)
   VIII. Circulatory System (5 sessions)
   IX. Digestive System (3 sessions)
   X. Urinary System (3 sessions)
   XI. Respiratory System (2 sessions)

LABORATORY OUTLINE  3 Hours each
   I. Long-term Study/Microscope/Library, Internet Research
   II. Viscera, Dialysis, Adam Software
   III. Kidney Regulation of Fluid & Electrolyte Balance
   IV. Tissues/Viscera (2 sessions)
   V. Tissues/Integument/Viscera
      Lab Practical I /Muscle Physiology (wear short sleeves)
   VI. Skeleton (4 sessions)
      Lab Practical II / Muscles (wear old clothes)
   VII. Reflex Physiology/Muscles
   VIII. Muscles
   IX. Building Muscles with Maniken/Muscles
   X. Muscles (4 sessions)
      Lab Practical III / Nervous System
   XI. Nervous System (2 sessions)
      Lab Practical IV / Heart (EKG’s)
   XII. Frog Cardiovascular Physiology/ Human Cardiovascular Physiology
   XIII. Rough Draft Research Paper Due/Heart
   XIV. Digestion
   XV. Heart
   XVI. Circulatory System (4 sessions) /Research Paper Due
      Lab Practical V/Respiration Physiology
   XVII. Cumulative Laboratory Challenge (Putting it all together)
Special Needs Statement:
McHenry County College offers support services for students with special needs. It is the student's responsibility to meet with the Special Needs Coordinator and provide current documentation regarding his/her disability. Please stop in or call the Special Needs Department, room A-257, 815-455-8676, as soon as possible if you would like more information about the accommodations that are available. In addition, it is important for you to discuss those accommodations with me so you are able to fully participate in this course.

Academic Integrity:
As an educational community, McHenry County College values the pursuit of academic excellence and integrity. In accordance with this philosophy and Chapter 10, Act 5 of the 1994 Illinois Community College Act, academic dishonesty in any form, including cheating, plagiarism, and all other acts of academic theft, is considered intolerable. Appropriate sanctions, up to and including suspension from the college will be imposed by authorized College personnel.

Copyright Policy:
The College will maintain current procedures and guidelines to ensure that all staff and students comply with applicable copyright laws and other intellectual property protection laws. The College will encourage staff and students to engage in the development of intellectual property and facilitate ownership protections with respect to such development of intellectual property.

The College expects that staff and students will act responsibly and ethically in a manner consistent with all copyright laws and College copyright procedures and guidelines. This policy authorizes the College to adopt and maintain such procedures and guidelines necessary to ensure compliance with copyright laws and to facilitate ownership protection with respect to the development of intellectual property.

Student Code of Conduct and the Judicial Process:
Consistent with the McHenry County College mission is an expectation that students will govern themselves in terms of appropriate behavior with emphasis on self-respect and respect for others. It is the practice of the College to respect the properly exercised rights of its students. The College recognizes a student’s rights within the institution to freedom of speech, inquiry and assembly; to the peaceful pursuit of education; and to the reasonable use of services and facilities of the College.

The College has adopted a Student Code of Conduct and judicial process in order to maintain a learning environment of respect, civility, safety, and integrity for all members of the College community.

Whenever possible, sanctions for violations of the Student Code of Conduct may be educational in nature. However, violations affecting the health and safety of members of the College community are deemed to be the most serious. Therefore, acts of violence, threats or dangerous behavior are most likely to result in a suspension from the college. Violations of the academic dishonesty policy may also result in suspension or expulsion from the institution and/or reduced or failing grade.

Teaching Schedule:
The scheduling of the activities and teaching strategies on this syllabus, but not the objectives or content, may be altered at any time at the discretion of the instructor.
BIOLOGY 260- Spring 2006

Section 002: 5:30pm-7:00pm, MW, A-220, Lecture, Firak

Bo1: 7:00pm-9:50pm, MW, A-220, Laboratory, Firak

INSTRUCTOR INFORMATION

INSTRUCTOR: Deb Firak

Office: B255-B

Office Hours: Mon. & Wed. 4:00pm-5:00pm; Thurs. 11:30am-1:30pm; Fri. 11:00am-12:00pm

Phone/Voice Mail: (815) 455-8567

E-mail: dfirak@mchenry.edu

Correspondence can also be left with the faculty secretary in B252 (815) 455-8750

COURSE MATERIALS


Biology 260 is an intense lecture/laboratory course where there will be a variety of approaches to instruction. This is participatory biology and everyone gets to be a victim (volunteer).

COURSE POLICIES

Grading:

Seven hour exams and five lab practical exams (no make-up exams...drop the lowest exam grade)……………………………………60%

Research paper (one full letter grade reduction for each 24 hours/ or part late)…………………………………………………….20%

FINAL EXAM………………………………………………………………………………………………………………………..20%
GRADING SCALE

92% = A
84% = B
76% = C
65% = D

Regular and prompt attendance at all classes is expected, appreciated and crucial to your success in this course. Students who will be absent are to contact the instructor prior to the class they will miss. In the event that the instructor is not at her/his desk, leave a message on voice mail including your name, date, time, and reason for absence.

This is a laboratory science course and you are responsible for completing all laboratories. In the event that you have an excused absence, you must make up the lab during a designated lab time or at a time which is convenient for the instructor. (For some physiology labs this may necessitate your doing the lab during the next semester that Biology 260 is offered.) You are responsible for turning in all data for physiology labs. Final grades will not be given until all labs are completed.

For every three labs missed and not made up, your final grade will be lowered one full letter grade.

Lab Safety: Some labs will utilize preserved organisms. During labs involving preserved material, all students will wear gloves and safety glasses to prevent exposure to preservatives. Safety glasses and latex gloves will be provided by the instructor. If you have a latex allergy, you are responsible for obtaining your own latex-free gloves. NO CONTACT LENSES ARE TO BE WORN. NO FOOD ALLOWED IN THE LAB!!! All students will clean the tables with cleaning solution and wash their hands before and after each lab session. Students need to be aware of the importance of being careful with all lab materials so that they do not endanger themselves or others.

Academic Honesty: Cheating in any form on an exam will result in a zero on the exam for the first offense and an F in the course for the second offense. Intentional plagiarism will result in a zero on the research paper.

Exam and paper policy: All exams and papers will be returned for your examination and then collected and kept in a file for you. They will be destroyed at the end of the following semester.

Note: Learning Objectives are attached.

The instructor reserves the right to modify this syllabus.
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