**Instructor:** Dr. Kelly J. Sexton  
**Office:** C234  
**Office Phone:** 972-273-3512 (I would prefer that you email me)  
**Email address:** ksexton@dcccd.edu

**Course description:** This course will examine the special senses, endocrine, cardiovascular, reproductive, respiratory, digestive and urinary systems with special attention paid to homeostasis. Emphasis is on structure, function and the interrelationships of the human systems. **Prereq—C or better in Biol 2401 or equivalent.**

**Course objectives:**
1) Identify the structures and understand functions of endocrine, reproductive, respiratory, digestive, cardiovascular and urinary systems.
2) Understand the interrelationships among the various organ systems.
3) Understand regulatory mechanisms and homeostatic control of the organism.
4) Develop an understanding of the organism as a “whole” and the contributions each organ system makes.

**Course Management:**
This course will rely heavily on teams and team-work. You will be sorted into teams on the first day in lab. Teams will consist of 4 (or 3) people. A CONSIDERABLE portion of your grade will depend on your team members.

**Required Materials:** available in the bookstore and elsewhere.

1. **TEXTBOOK:**
FREE textbook at [www.openstaxcollege.org](http://www.openstaxcollege.org) OR

ANY college level Human Anatomy and Physiology Text, Current or one previous edition.

Suggested Authors: Seeley, Marieb, Tortora, Martini, Amerman (Do NOT purchase or use Hole’s book).

2. **LAB BOOK: Human Anatomy and Physiology Laboratory Manual.**
11th ed. (10th or 9th ed) by Marieb and Mitchell
3. Scantrons for lecture and lab exams (Form 882-E……green form)
Attendance:

Regular attendance in this class is **ESSENTIAL** and is your responsibility. These classes progress so quickly that even a single absence can negatively impact your grade. If you miss a class you will be depriving your team of your expertise for that quiz or test.

Cheating:

Cheating, in any form, will not be tolerated **UNDER ANY CIRCUMSTANCES. Cheating has become a BIG problem in lab—we will be instituting new procedures for lab tests.**

Food or Drink:

It is the policy of North Lake College that **NO FOOD OR DRINK** is allowed in classrooms or laboratories.

E-CAMPUS:

E-campus will be used extensively in this class. The web address is **ecampus.dcccd.edu** (NOTE: There is NO www in front of the web address).

Prior to the first day of classes each student **MUST** sign onto e-campus and fill out the student profile **including a valid email address.** E-campus will be used to communicate with students and to post grades.

Grading Policy:

1) Lecture:

There will be **FOUR LECTURE EXAMS.** Lecture exams will be given in the **Testing Center** (A425, phone 972-273-3160). Lecture exams are the only part of the course that does not contain a team component. You will have about a week to take the exam. TESTING CENTER hours are 8:30 am to 8:30 pm on MTWR and 8:30 to 3:30 on FS. The TESTING CENTER will NOT give out exams AFTER 2:00 pm on FS. The TESTING CENTER **is closed on Sunday.** No make-up lecture tests will be given. Please see rules for TESTING CENTER later in the syllabus.

**Lecture Exams**

Lecture exams will consist 100 objective questions consisting of multiple choice, matching, labeling diagrams, and fill in the blank. These are worth 1 point each. Lecture exams will comprise **50% of the Final Grade.** The lecture exams do not have a team component.
Quizzes:

This class requires quite a bit of preparation outside of class. To make sure that you DO NOT get behind there will be QUizzes over the previous materials (typically 15 questions).

Quizzes are TEAM QUizzes. Quizzes are given in lab or lecture. Quizzes given in lab are ANNOUNCED. Quizzes given in lecture are UNANNOUNCED. Please do NOT be late. If you are late for the quiz you will not be allowed to take it with the group and you will not get the benefit of your team cooperation. Quizzes CANNOT BE MADE UP!!! However, the lowest 4 quizzes will be dropped.

You will evaluate your team members for Quiz portion of the class (ONLY). This is done as a Quiz average modification! You will grade your partners based on 100%.

Quizzes will comprise 25% of the Final Grade.

2) Laboratory:

There will be FOUR LAB EXAMS. These will be given in lab and will consist of a combination of 50 practical and objective questions. Lab exams CANNOT BE MADE UP. If you know you will miss an exam please contact the instructor PRIOR to the exam (some accommodation may be possible).

Lab exams will comprise 25% of the Final Grade.
Determination of Final Grade

Average of 4 Lecture Exams \( \times 50\% \)

Average of Quizzes \( \times 25\% \)
(drop the three lowest)

Average of 4 Lab Practicals \( \times 25\% \)

Add the 3 averages together to determine FINAL AVERAGE

**FINAL GRADE**

<table>
<thead>
<tr>
<th>Final Grade</th>
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<tr>
<td>A</td>
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<td>B</td>
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LINK TO ACCOMODATIONS AND NLC REGULATIONS

www.northlakecollege.edu/syllabipolicies
<table>
<thead>
<tr>
<th>Lecture sequence of topics</th>
<th>Textbook (most of them anyway)</th>
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<tbody>
<tr>
<td>Endocrines</td>
<td>Ch 18 Ch 17 Ch 18</td>
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<tr>
<td>Heart</td>
<td>Ch 20 Ch 18 Ch 20</td>
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<tr>
<td><strong>Exam 1</strong></td>
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<td>Blood vessels</td>
<td>Ch 21 Ch 20 Ch 21</td>
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<td>Blood</td>
<td>Ch 19 Ch 18 Ch 19</td>
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<tr>
<td><strong>Exam 2</strong></td>
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<tr>
<td>Lymphatics and Immune System</td>
<td>Ch 22 Ch 20,21 Ch 22</td>
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<tr>
<td>Respiration</td>
<td>Ch 23 Ch 22 Ch 23</td>
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<td>Urinary</td>
<td>Ch 26 Ch 25 Ch 26</td>
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<tr>
<td>Reproduction</td>
<td>Ch 28 Ch 27 Ch 28</td>
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<td><strong>Exam 4</strong></td>
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<table>
<thead>
<tr>
<th>Sequence of topics for lab</th>
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<tr>
<td>Special Senses: Vision</td>
<td>Ex 24</td>
</tr>
<tr>
<td>Special Senses: Hearing and Equilibrium</td>
<td>Ex 25</td>
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<tr>
<td>Anatomy of the Heart</td>
<td>Ex 30</td>
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<td>Anatomy of Blood Vessels</td>
<td>Ex 32</td>
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<td>Blood</td>
<td>Ex 29</td>
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<td>Lymphatics</td>
<td>Ex 35A</td>
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<td>Anatomy of the Digestive System</td>
<td>Ex 38</td>
</tr>
<tr>
<td>Anatomy of the Respiratory System</td>
<td>Ex 36</td>
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<td><strong>Exam 3</strong></td>
<td></td>
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<tr>
<td>Anatomy of the Urinary System</td>
<td>Ex 40</td>
</tr>
<tr>
<td>Anatomy of the Reproductive System</td>
<td>Ex 42</td>
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Exam 1

SPECIAL SENSES (lab only)

List the parts of the eyeball. What are the function of each? Be able to label each part.


Where does one find vitreous humor? Aqueous humor? Describe each. Where/when is each made?

Describe the lens. How is the shape changed? What does the lens look like during close up vision? During far vision?

Describe the functions of the ciliary muscle? How does the pupil dilate? Constrict?

How is the eyeball shaped with myopia? Hyperopia? What is presbyopia? What causes it?

How does the eyeball move around? What muscles and nerves are involved?

List the parts of the external, middle, and inner ear. What are the functions of each?

List the ear ossicles. What are each named for?

What is the vestibule? Utricle? Saccule? Describe the functions of the semicircular canals?

What is the cochlea? How is sound converted into action potentials?

Where does one find endolymph? Perilymph?

ENDOCRINES (lecture only)
Compare the roles of the endocrine and nervous systems in controlling homeostasis.

What is a hormone? What are the classes of hormones? List examples of each.

How do lipid soluble hormones exert their effect? List the steps.

How do water soluble hormones exert their effect? List the steps.

Compare the method of action by lipid soluble and water soluble hormones. List examples of each.

Compare and contrast permissive, synergistic and antagonistic hormone interactions. List an example of each.

Compare nervous, hormonal and humoral regulations of hormones. List an example of each.

Describe the pituitary gland. Contrast the mechanism of control of the hypothalamus over the neurohypophysis (posterior pit) and the adenohypophysis (anterior pit).

Describe each of the following glands. Which hormones come from each? Where were they produced? Are they water soluble or lipid soluble? What is their class? What is their target? What are their effects? How is their release regulated?

- anterior pituitary
- posterior pituitary
- thyroid gland
- parathyroid glands
- pineal gland
- pancreas
- adrenal glands
- testes
- ovaries

What happens if there is too much or too little of these hormones? List the effects of hyposecretion and hypersecretion. Be able to recognize the signs and symptoms of each.

**HEART (lecture and lab)**

Describe the location of the heart in the thorax. List the cavities which surround the heart from the outside in.

List and describe the layers of the pericardium. What is found in the pericardial space? What is cardiac tamponade? How can it develop?

Label a diagram of the heart. Include chambers, valves, SA node, AV node, AV bundle, Bundle branches, Purkinje fibers, Chordae tendons, etc.
Draw and label a cardiac muscle cell. What are intercalated discs? Why are they important?

How does the resting potential of cardiac muscle differ from skeletal muscle? What does this result in?

Define automaticity and autorhythmnicity.

Draw and label the action potential of skeletal muscle (include all channel openings and closings and movements of ions). Draw and label the action potential of cardiac muscle (include all channel openings and closings and movements of ions). Compare and Contrast the two.

What is the “extra event” that occurs in the AP of cardiac muscle vs skeletal muscle? Why is this important?

Compare the refractory periods of skeletal and cardiac muscle? Why is this important?

Why is it “impossible” to tetanize the heart? What would be the result if you it were to “tetanize”?

What is a “picture” of the electrical activity of the heart called? Draw a typical one.

Name the waves and intervals present on a normal ECG and state what electrical activity is represented by each. What is a U wave?

What general cardiac problems can be identified from an ECG?

Discuss heart block. What is the normal treatment?

What is the normal depolarization rate of the SA node? What is a normal heart rate? Why are they different?

Define stroke volume and discuss how stroke volume can be altered.

How do you calculate cardiac output?

What is a normal stroke volume? How is stroke volume regulated?

What is a normal heart rate? How is HR regulated?

Describe the role of the ANS in regulating heart rate, stroke volume, and explain the effect on cardiac output using the appropriate formula (CO = HR x PR).

List the events in one cardiac cycle. Be able to label and discuss the Wigger’s Diagram.

What causes the normal heart sounds. What is an abnormal sound called? What are some of the things that produce abnormal sounds?
List the hormones that affect HR, SV and CO and their effects.

EXAM 2

BLOOD VESSELS (lecture only)

What are the “two” circulatory systems? List the parts of each.

List the parts of the coronary circulation. What is the LAD now called?

What is an artery? A vein? A capillary? Discuss the structures and types of each.

Why is it important for the walls of the arteries to be “flexible”? What is pulse pressure and how would flexibility of the arterial wall affect it?

What happens to blood pressure as the blood moves through the circulatory system? What is the blood pressure in the large veins? In the right atrium? Where is BP the highest? The lowest?

What anatomical feature of veins keeps the blood from flowing in reverse? What “forces” cause the blood to move against gravity back toward the heart?

What are varicose veins? How do they form?

Write the equation for volume of blood flow. List how an increase or decrease in each variable would affect blood flow. Do they have an equal effect? Why or why not?

What is “total cross-sectional diameter”? How does it affect blood flow? Where does blood flow fastest? Slowest?

What is peripheral resistance? Write the equation for peripheral resistance? List ways to increase or decrease peripheral resistance. Do they have an equal effect? Why or why not?

Write the equation for BP. List how an increase or decrease in each variable would affect blood pressure. Do they have an equal effect? Why or why not?

What are Korottkoff sounds?

BLOOD (lecture and lab)

What are the formed elements of blood? Why not just call them cells? What is plasma? What is a hematocrit?

What is a leucocyte? Describe the different types. How many are there? What are their functions? Where do they come from?

What is a thrombocyte? Describe them. How many are there? What are their functions? Where do they come from?

List the steps in coagulation. What are clotting factors? Where do they come from? What happens when one or more are missing?

What is the extrinsic pathway? The intrinsic pathway? The common pathway? List the steps of the common pathway.

What is NFP? How is it calculated? How much filtrate is produced per day? Where does it go?

Exam 3

LYMPHATICs AND IMMUNITY (lecture and lab)

What are lymphoid tissues? List them. What is their function?

What is lymph? How is it produced? How is it returned to the circulatory system?

What is a pathogen? What is an antigen? What is resistance? What is susceptibility?

What are physical and chemical barriers?

What is complement? How does it work? What are the two pathways to activation? Compare them.

What is interferon?

What do NK cells do? What do phagocytes do? What are APC’s?

What is immunity? What are the different types?

What are B cells? Where do they mature? What happens to them after they mature?

What is immunocompetent mean? What is positive and negative selection?

How are B cells activated? What is responsible for “choosing” the correct B cell?
List the steps in B cell activation. What do they become? What do they then produce?

List the 5 types of antibody. How are they different? How do they “destroy” the antigens (5 ways)?

What are T cells? List the types and functions of each. Where do they mature? What happens to them after they mature?

How are T cells activated?

List the steps in T cell activation. What do they then do? How do they “destroy” the antigens?

What cell is responsible for attenuating the immune response?

Which cell is the primary target for HIV cells? Why is this the worst possible (for the patient) cell to lose?

What is an allergic reaction? Discuss the different types of allergic reactions and how each develops.

A patient entering the emergency room has been stung by a bee, and is exhibiting anaphylaxis. Explain the immunological basis for this reaction.

A patient who is type B is accidentally infused with type AB. Explain the specific interactions, if any that will occur between the donor’s blood and recipient’s blood.

**DIGESTION (lab only)**

Describe the parts of the GI tract. Which structures are accessory structures?

Identify the layers of the wall of the gastrointestinal tract, and briefly describe their structures and functions.

Which organs display differences in “layers”?

Which layer shows the most variability? Describe this layer as you move through the GI tract.


What are parts of the pharynx?

How is the structure of the esophagus different from that of the trachea? What structures help to keep the esophagus closed? What type of muscle is found in the esophagus? What type of epithelial tissue is seen here?
What is mesentery? Describe its structure. Discuss its importance and function. Where is the greater omentum? the lesser omentum? the mesocolon? The ligaments of the liver?

Describe the gastric pits and the cells which are found here. Which cells do what?

Describe the structure of the pancreas. What are its major products? Where does it secrete these products? Name the two ducts of the pancreas.

What is the hepatopancreatic sphincter, ampulla and papilla?

Describe the liver. Name the lobes of the liver.

What are the regions of the small intestine? What are plicae? villi? microvilli? What is their purpose? What are peyer’s patches? What is their purpose?

What are the regions of the large intestine? What is the primary function of the large intestine? What is the vermiform appendix? What is its purpose?

**RESPIRATION (lecture and lab)**

What are parts of the upper respiratory tract? Lower respiratory tract? Functions of each?

What is the conducting zone? What is the respiratory zone?

Describe the different regions of the pharynx.

Describe the parts of the larynx. List the cartilages. What is the glottis? the epiglottis?

How do the vocal cords produce sounds? How is the pitch regulated? How is the volume regulated?

Discuss how the left primary bronchus is different from the right primary bronchus.

Describe the structure of the respiratory membrane? Name the layers.

What is surfactant? Which cells produce it? Why is it important?

How is oxygen transported? How much is transported dissolved? Attached to hemoglobin? How many molecules of oxygen can one molecule of hemoglobin transport? How many molecules of oxygen can one RBC transport?

How is carbon dioxide transported? What is carbaminohemoglobin?

Write out the formula that describes the conversion of carbon dioxide to bicarbonate ion. What is the chloride shift? Where does it occur?
Draw and label the oxyhemoglobin dissociation curve.

What is curve shifting? What factors cause the curve to shift? Indicate whether a shift to the left or right occurs with each factor.

How does curve shifting relate to loading and unloading? List each factor and what effect it has on the curve.

Exam 4

URINARY (lecture and lab)

What are the parts of the urinary system?

Discuss the structure of the kidney. List the regions.

List the functions of the kidneys.

What is a nephron? Draw and label a nephron. Include all the vascular, tubular and regulatory parts.

Describe the nephron filtration membrane. What are the 3 layers? What are the relative sizes of “holes” in each layer.

Discuss the components of blood that are filtered? not filtered? What determines what is filtered and not filtered?

What is Net Filtration Pressure? Write the formula and discuss how altering each factor would affect NFP. What is GFR? How does NFP affect GFR?

What is filtrate? How much is produced per minute? per hour? per day? Predict the effect on GFR and NFP of each of the following: a) hemorrhage b) increased permeability of the endothelial-capsular membrane c) constriction of the lumen of the PCT. Explain your reasoning for each.

How is GFR regulated? Describe the effects of vasoconstriction and vasodilation of the AA and EA on NFP and GFR.

Discuss absorption in the PCT. What does the filtrate contain after passing through the PCT? What is the volume left?

Describe the structure of the nephron loop (loop of Henle). How is the ascending limb different from the descending limb. List the functions of each.

How does the length of the loop of Henle affect its ability to concentrate urine?

Describe the osmolarity of the medulla? How is this maintained?

Discuss the functions of the DCT and CD?
What are the effects of ADH and Aldosterone on the DCT and CD?

**REPRODUCTION (lecture and lab)**

Discuss sexual vs asexual reproduction? What are the advantages and disadvantages of each?

Discuss the diploid nature of humans? How are gametes different? Where are gametes produced?

List the parts of the male reproductive system. Describe the function of each.

Discuss the structure of the scrotum and testes. Discuss temperature control of the testes. Why is it important?

Where do the testes originate? When do they descend?

Describe the seminiferous tubules, the straight tubules, the rete testis. Trace the path of sperm through the male reproductive tract.

List the steps in spermatogenesis: Describe meiosis? Describe spermiogenesis?

What is a spermatogonium A and B? What is a primary spermatocyte? A secondary spermatocyte? A spermatid? A spermatozoan? Which are diploid? Which are haploid?

How many sperm are produced per day?

Discuss the structure of the penis. Name the chambers. What is the tunica albuginea? How is an erection achieved?

What are the accessory sex glands? What do each produce?

What is BPH? Why does it cause difficulty in urination?

Draw and label the hormone profile for a male for a 28 day period. Include GnRH, FSH, LH, and testosterone.

List the parts of the female reproductive system. Describe the functions of each.

List the steps in Oogenesis. What is the difference between a primary oocyte, a secondary oocyte and an ovum? What is a polar body?

Describe the growth and development of the follicle.

Which cell do humans ovulate?

What causes ovulation? When does it normally occur?
Discuss the pathway of the secondary oocyte from ovulation to fertilization to implantation.

Draw and label a hormone profile for a 28 day cycle in the female reproductive system. Include FSH, LH, Estrogen, Progesterone

How long is the oocyte viable after ovulation? How long can sperm survive in the female reproductive tract? Which days of the cycle can conception occur?

Compare and contrast the processes of spermatogenesis and oogenesis.

Describe the production of testosterone. When is it produced and by what cells?

Describe the hormones produced by the ovary. When is each produced and by what cells?

Describe the secondary sex characteristics of males and females.