BIOL 241: Human Anatomy and Physiology I

Syllabus
Spring 2010

Instructor: Joel Dahms
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Office hours: By appointment
Office phone: 206.526.7004 (Voice mail only)

Class meeting times:
Sat 8:30PM- 3:00PM in: AS1615 (lecture & lab)


Required texts

Optional Texts

Grading
Exams  (400 points)
Lab Practical Quizzes  (200 points)
Lab Reports and Assignments  (200 points)
Total  (800 points)

Grades will be assigned as follows:

<table>
<thead>
<tr>
<th>Percent</th>
<th>Grade</th>
<th>Decimal Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>95 - 100%</td>
<td>A</td>
<td>3.9 - 4.0</td>
</tr>
<tr>
<td>90 – 95</td>
<td>A-</td>
<td>3.5 - 3.8</td>
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<tr>
<td>85 - 89</td>
<td>B+</td>
<td>3.2 - 3.4</td>
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<tr>
<td>80 - 84</td>
<td>B</td>
<td>2.9 - 3.1</td>
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<tr>
<td>75 - 79</td>
<td>B-</td>
<td>2.5 - 2.8</td>
</tr>
<tr>
<td>70 - 74</td>
<td>C+</td>
<td>2.2 - 2.4</td>
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*Note:* a 4.0 grade requires a 96%
Commitment
Anatomy and Physiology is a course that requires a strong commitment in order to succeed. It is not an easy course: the subject-matter is difficult and learning the terminology can be like learning a foreign language. To successfully complete this course you must commit to attend all lectures and laboratory sessions and plan on spending at least an additional 20 hours per week of studying time. This will include not only reading the text but also several hours per week studying laboratory materials (e.g. microscope slides, bones, muscles) for practical quizzes. Additional resources such as computerized review programs, audiovisual materials and student tutors are available during the open laboratory sessions (see below).

Attendance
Students should attend every class session, especially since the class only meets once a week; missing even one class session can leave you way behind. If you miss a class session, it is your responsibility to obtain the lecture notes, handouts, assignments or other materials distributed in class. If you must miss class due to prolonged illness or other unexpected circumstances, you should notify the instructor as soon as possible to make special arrangements.

Lectures
Due to the amount of information covered in the course, lectures cannot cover all the relevant material. Students will be responsible for all the material in the chapters covered unless otherwise noted. However, in order to help students determine what to focus on, objectives for each unit are available on the course website.

Objectives
There are five units in BIOL 241, each with an exam at the end. The objectives for each unit are designed to give students a general list of learning outcomes for the unit, and to serve as a study guide for the exams and quizzes. They cover most of the things you need to know; however, they are not exhaustive.

Labs
Many laboratory exercises must be completed in the laboratory. For each lab assigned, you will need to complete all the questions found in the lab manual at the end of each lab entitled “Review Sheet” and turn it in to me the week following each lab. NOTE: you must turn in the actual pages torn out of a laboratory manual; no photocopies will be accepted. You must also include any data obtained from the lab exercise or drawings of microscope slides. Students who miss a laboratory exercise must make arrangements to complete the activities during open lab time in order to get credit for that exercise. Students who report data obtained from another student will receive the grade of 0 for that exercise.

Open laboratory
There will be specified times during the week that the laboratory room will be open to students and staffed by student tutors who have taken A&P before; some quarters, there will also be open lab time on Sundays. During these times, you will be able to make up
missed labs (with some exceptions), study the lab materials for upcoming lab practical quizzes and exams, and have your questions answered by the student tutors. The schedule of open lab times should be available during the first week of the quarter and open lab times usually start in the second week of class.

**Exams**
There will be five exams, the first four worth 75 points and the final worth 100 points. The exams will be composed of multiple-choice questions, matching, short answer, fill-in-the-blank and short essay questions and may include diagrams for you to label. A new, unwrinkled Scantron form and a #2 pencil will be needed for each exam. These are available at the campus bookstore or at the Munch Mart. The exam will contain questions pertaining to all the objectives listed for the unit. It is assumed that each student will do their own work. Cheating is unacceptable and will be referred to the Vice President of Student Affairs for disciplinary action. **NOTE: Exams may not be rescheduled or made-up due to tardiness or absence. Students with extraordinary circumstances should discuss them with the instructor as soon as the situation occurs.** If you know ahead of time that you will miss an exam, let the instructor know as far ahead of time as possible.

**Lab Practical Quizzes**
There will be four lab practical quizzes, each worth 50 points. These are designed to test your “practical” ability to identify cells, tissues, bones, muscles and other structures from slides, models, or diagrams. Consult the **Lab Practical Study Guide** (attached) for details on what you are expected to know for each practical.

**Assignments**
There will a handful of group and/or individual assignments during as the quarter determined by available time. I will provide more details about these as the quarter progresses.
<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topics - Chapters Covered</th>
<th>Lab Exercises</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>4/10</td>
<td>Introduction - 1&lt;br&gt;Chemistry review - 2&lt;br&gt;Cell membranes and physiology - 3</td>
<td>Lab Safety &amp; Introduction&lt;br&gt;Lab #3 Microscope use&lt;br&gt;Lab #4 Cell anatomy</td>
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<tr>
<td>2</td>
<td>4/17</td>
<td>Cell anatomy - 3&lt;br&gt;Central dogma - 3&lt;br&gt;Epithelial tissue - 4</td>
<td>Lab #5A-Cell Transport</td>
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<tr>
<td>3</td>
<td>4/24</td>
<td>Connective tissue - 4&lt;br&gt;Integumentary system - 5</td>
<td>Lab #6A-Tissues: Epithelia, Connective&lt;br&gt;● Exam 1 (Chaps 1-3)</td>
</tr>
<tr>
<td>4</td>
<td>5/1</td>
<td>Bone structure &amp; physiology - 6</td>
<td>Lab #7-Integumentary&lt;br&gt;Lab #9-Skeletal overview&lt;br&gt;Histology review&lt;br&gt;● Exam 2 (Chaps 4, 5)</td>
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<tr>
<td>5</td>
<td>5/8</td>
<td>Bone growth &amp; repair - 6, 7*</td>
<td>Lab #10-Axial skeleton&lt;br&gt;● Practical 1: Histology</td>
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<tr>
<td>6</td>
<td>5/15</td>
<td>Articulations - 8&lt;br&gt;Muscle structure - 9</td>
<td>Lab #11-Appendicular skeleton&lt;br&gt;Lab #13-Articulations&lt;br&gt;Split femur demo&lt;br&gt;● Exam 3 (Chaps 6, 7)</td>
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<tr>
<td>7</td>
<td>5/22</td>
<td>Muscle metabolism - 9, 10*&lt;br&gt;Neurophysiology I – 11</td>
<td>Lab #14-Muscle overview&lt;br&gt;Lab #15-Gross anatomy of muscles&lt;br&gt;● Practical 2: Bones</td>
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<tr>
<td>8</td>
<td>5/29</td>
<td>Neurophysiology II – 11</td>
<td>Lab #15-Gross muscles (cont’d)&lt;br&gt;Assign Lab 18b&lt;br&gt;● Exam 4 (Chaps 8 – 10)</td>
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<tr>
<td>9</td>
<td>6/5</td>
<td>CNS: Brain - 12&lt;br&gt;CNS: Spinal Cord – 12</td>
<td>Lab #17-Nervous tissue&lt;br&gt;Lab #19-Brain anatomy&lt;br&gt;&lt;strong&gt;Brain dissection&lt;/strong&gt;&lt;br&gt;Lab #21-Spinal cord&lt;br&gt;Spinal cord demo&lt;br&gt;● Practical 3: Muscles</td>
</tr>
<tr>
<td>10</td>
<td>6/12</td>
<td>Peripheral Nervous System - 13&lt;br&gt;Autonomic Nervous System - 14&lt;br&gt;Special Senses – 15</td>
<td>Lab #22-Reflexes&lt;br&gt;● Quiz 3: Wed 6/10&lt;br&gt;● Practical 4: Brain &amp; CNs</td>
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<tr>
<td>11</td>
<td>Fri 6/18</td>
<td>● Final Exam due (Chaps 11 –15)</td>
<td>● Final Exam due (Chaps 11 –15)</td>
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*These chapters will not be covered in lecture but you ARE responsible for the content of these chapters
For Lab Practical Exam #1 (5/8) you should know the following:

**Histology**
Be able to identify the following tissues microscopically:
- **Epithelia**: simple squamous, simple cuboidal, simple columnar, psuedostratified ciliated columnar, transitional, stratified squamous, stratified columnar
- **Connective tissues**: loose CTPs (areolar, adipose, reticular), Dense CTPs (dense regular, dense irregular, elastic), cartilage (hyaline, elastic, fibrocartilage), blood

**Integumentary System**:
- Be able to identify the following structures microscopically: epidermis (all of the layers), dermis (reticular and papillary), sweat glands (apocrine, merocrine), sebaceous glands, sebaceous follicles, arrector pili muscle

For Lab Practical Exam #2 (5/22) you should know the following:

**Axial skeleton**
- Know all the bones and bone parts listed on the List of bones and bone parts – Axial found attached to the syllabus (and also available on the website). This portion will be made up of skulls and disarticulated bones.

**Appendicular Skeleton**
- Know all the bones and bone parts listed on the List of bones and bone parts – Appendicular. This portion will be made up mostly of disarticulated bones.

For Lab Practical Exam #3 (6/5) you should know the following:

**Muscles**
- Know the names, locations, and general functions of all the muscles on the list of muscles found attached to the syllabus. You need to know the origins and insertions only for the muscles listed in **bold**

For Lab Practical Exam #4 (6/12) you should know the following:

**Brain and Cranial nerves**
- Know the names and locations of the internal and external brain structures on the attached list
- Know the 12 cranial nerves by name and by number and know their major functions
List of Bones and Bone Parts – Axial

Axial Skeleton

1. Skull

   cranial bones - frontal, occipital, sphenoid, ethmoid, parietal, temporal
   
   facial bones - mandible, vomer, maxilla, zygomatic, lacrimal, nasal, palatine, inferior nasal conchae
   
   sutures - coronal, sagittal, squamous, lambdoid
   
   sinuses - frontal, maxillary, sphenoidal, ethmoidal
   
   processes - styloid, zygomatic, mastoid, palatine
   
   foramina – foramen magnum, supraorbital foramen, infraorbital foramen, mental \n   formaen, optic foramen, foramen ovale, foramen rotundum, jugular foramen
   
   fontanels - frontal (anterior), occipital (posterior), mastoid (posterior lateral), \n   sphenoidal (anterolateral)
   
   other structures - zygomatic arch, orbit, sella turcica, crista galli, cribiform plates, \n   external auditory canal, condylar process of mandible, nasal \n   septum (and its constituents), hard palate (and its constituents)

2. Vertebral column

   types of vertebrae - cervical, atlas, axis, thoracic, lumbar, sacral, coccygeal
   
   parts of a vertebra - body, spinous process, transverse process, inferior and superior \n   articular processes, vertebral foramen, costal facets, intervertebral disc

3. Thorax

   ribs - true, false, floating
   
   parts of a rib – head (capitulum), neck, body, tubercle
   
   parts of the sternum - manubrium, body, xiphoid process, clavicular articulation, \n   jugular notch

4. Hyoid bone

   hyoid bone – that’s all, just the bone. Really.
List of Bones and Bone Parts – Appendicular

Appendicular Skeleton (you will need to be able to distinguish a right bone from a left bone)

1. **Shoulder girdle**
   - parts of the scapula - spine, acromion process, glenoid fossa, supraspinous fossa, infraspinous fossa, subscapular fossa, coracoid process
   - parts of the clavicle - sternal end, body, acromial end

2. **Upper appendages**
   - parts of the humerus - head, neck, greater tubercle, lesser tubercle, lateral epicondyle, medial epicondyle, trochea, capitulum, coronoid fossa, olecranon fossa, deltoid tuberosity
   - parts of the ulna - olecranon process, coronoid process, semilunar (trochlear) notch, radial notch, styloid process, head
   - parts of the radius - head, neck, radial tuberosity, styloid process, ulnar notch
   - types of carpals - scaphoid, lunate, triquetral (triangular), pisiform, trapezium, trapezoid, capate, hamate
   - metacarpals - base (proximal), shaft, head (distal), and know the numbering
   - types and parts of the phalanges - proximal, middle, distal, pollex

3. **Hip girdle**
   - parts of the innominate bone - ilium, iliac crest, anterior superior iliac spine, posterior superior iliac spine, anterior inferior iliac spine, posterior inferior iliac spine, greater sciatic notch, ischial tuberosity, ischial ramus, lesser sciatic notch, pubis, acetabulum, obturator foramen, ischiium, pubic symphysis, sacroiliac joint

4. **Lower appendages**
   - parts of the femur - head, neck, greater trochanter, lesser trochanter, lateral epicondyle, medial epicondyle, lateral condyle, medial condyle, intercondylar fossa, patellar surface
   - parts of the patella - base, apex, articular facets
   - parts of the tibia - lateral condyle, medial condyle, tibial tuberosity, intercondylar eminence, medial malleolus
   - parts of the fibula - head, neck, lateral malleolus
   - types of tarsals - calcaneus, talus, cuboid, navicular, first, second, and third (lateral, intermediate and medial) cuneiform
   - metatarsals - base (proximal), shaft, head (distal), and know the numbering
   - types and parts of the phalanges - proximal, middle, distal, hallus (hallux)
List of Muscles
Know the origin and insertion of all the muscles listed in bold letters.

**Head and Face**
- occipitofrontalis
- orbicularis oculi
- corrugator supercili
- orbicularis oris
- buccinator
- depressor labii inferiorus
- levator labii superiorus
- zygomaticus
- masseter
- temporalis

**Neck**
- platysma
- digastric
- sternocleidomastoid
- splenius capitus

**Chest**
- pectoralis major
- serratus anterior
- external intercostals
- internal intercostals
- diaphragm

**Abdominal Region**
- rectus abdominus
- external oblique
- internal oblique
- transverse abdominus

**Back**
- trapezius
- latissimus dorsi
- splenius capitus

**Shoulder**
- supraspinatus
- infraspinatus
- subscapularis
- teres major
- rhomboideus major
- levator scapulae
- deltoid

**Upper Arm**
- biceps brachii
- brachialis
- triceps brachii
- brachioradialis

**Lower Arm**
- flexor carpi radialis
- flexor carpi ulnaris
- flexor digitorum superficialis
- extensor carpi ulnaris
- extensor digitorum
- extensor carpi radialis
- flexor pollicis longus
- extensor pollicis longus

**Hip and Thigh**
- psoas major
- iliacus
- gluteus maximus
- gluteus medius
- adductor longus

**Upper Leg**
- sartorius
- quadriceps femoris
- rectus femoralis
- vastus lateralis
- vastus medialis
- vastus intermedius
- gracilis
- adductor longus
- “Hamstrings”
- biceps femoris
- semitendinosus
- semimembranosus

**Lower Leg**
- tibialis anterior
- extensor hallucis longus
- extensor digitorum longus
- fibularis (peroneus) longus
- gastrocnemius
- soleus
- flexor hallucis longus
- flexor digitorum longus
Brain structures

Locate on a diagram and (for the cranial nerves only) describe the function of each of the following structures or landmarks of the brain:

**External structures**
- cerebral hemispheres
- cerebrum
- midbrain
- cerebellum
- pons
- medulla
- central sulcus
- precentral gyrus
- postcentral gyrus
- lateral sulcus
- longitudinal fissure
- frontal lobe
- parietal lobe
- occipital lobe
- temporal lobe

**12 cranial nerves:**
- I. Olfactory
- II. Optic
- III. Occulomotor
- IV. Trochlear
- V. Trigeminal
- VI. Abducent
- VII. Facial
- VIII. Vestibulocochlear (aka. Auditory)
- IX. Glossopharyngeal
- X. Vagus
- XI. Accessory (aka. Spinal Accessory)
- XII. Hypoglossal

**Internal structures:**
- corpus callosum
- basal ganglia (nucleus)
  - caudate
  - putamen
- internal capsule
- thalamus
- hypothalamus
- hippocampus
- amygdala
- pineal gland
- pituitary gland
- reticular formation
- fornix
- substantia nigra
- cingulate gyrus
- optic chiasm
- lateral ventricles
- mammillary bodies
- corpora quadrigemina
  - inferior colliculus
  - superior colliculus