

BIOLOGY 2011
HUMAN ANATOMY - MSK
(“Where one has to work their phalanges to the periosteum!”)
Spring 2018

LAB MANUAL



General Information: Lecture

There are a total of two lecture exams (MT & Final) and two laboratory examinations. The two lecture exams will consist of a variety of questions (mostly fill-in-the-blank type, T/F, MC). The midterm exam will be approximately 125-200 questions. The Final exam will be primarily fill-in-the-blank, short answer, clinical corner, and will consist of approximately 150-300 marks. The Midterm (MT) Exam will cover information from May 1st – May 10th, and the Final Exam will cover information from MT – May 23rd.

General Information: Laboratory Examinations

There will be a total of two lab exams. Each lab exam will include approximately 25-50 stations. Each station will have between 2 and 4 "tags" which you will identify within a set period of time. This type of exam is affectionately known as a BELL RINGER! You will be tested on bones, models, prosected specimens, radiological, and histological materials.

I welcome you to Biology 2011 (Spring 2018) and hope that your experience in human anatomy will be a stimulating and enjoyable one. If you encounter difficulties, don't endure them in isolation. Often much can be done to help. Don't wait until problems are unmanageable to seek help!

Biology 2011 - Policies

The policies set out below are for the students' benefit. These policies are somewhat stringent and inflexible. These policies are set forth to ensure that all students are treated fairly.

1. All tests must be written in pen to be eligible for mark revision.
2. Simple adding mistakes should be given to Donna Newhouse for correction.
3. When exams are returned, the student has one week to challenge any discrepancies in marking/grading. After one week no mark adjustments will take place. It is therefore in your best interest to review your marked paper when they are returned.
4. If you feel you deserve more marks for a question, attach a note to your paper explaining which question(s) should be re-marked and why. However, should you submit your exam it may be marked in its entirety and thus there is a chance the initial mark may decrease.
5. In the event that a student has to miss a lab or lecture exam for emergency reasons, it will be the student's responsibility to get in touch with Donna Newhouse prior to the scheduled exam. A message may be left at 474-9016.
6. In the event that a student has to miss a lab or lecture exam for medical reasons, the student must submit a signed medical note (from the attending physician) within 7 days after the exam. It is the student's responsibility to get in touch with Donna. Failure to comply with points 5 or 6 will result in a grade of zero for the exam.
7. Video or photographic equipment is/are NOT permitted in the laboratory at any time.
8. All laboratory specimens and models must be treated with the utmost respect and care. The human bones are fragile and irreplaceable. If any breakage should occur please report this to a TA or Donna.
9. There is an established chain of command should you have any problems associated with this course. The chain of command is as follows: T.A.'s...Donna Newhouse...Chairman of Biology...Dean of Science and Environmental Studies...V.P. Academics...Dr. McPherson. Issues or problems should be resolved at the lowest level possible. (Dr. McPherson shouldn't have to resolve the problem of a half mark injustice on a lab exam!)

****Subject to Change**

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---------------|---|--|--|--|---|---------------|
| | April 30 | May 1 LECTURE AT 1001 6:00-9:00 | May 2 LAB Integument & Bones 6:00-9:00 | May 3 LAB Integument & Bones 6:00-9:00 | May 4 LEC or LAB Bones 6:00-10:00 TBA | May 5 |
| May 6 | May 7 LECTURE AT 1001 6:00-9:00 | May 8 LECTURE AT 1001 6:00-9:00 | May 9 LEC & LAB Bones 6:00-9:00 | May 10 LAB Bones 6:00-9:00 pm | May 11 LEC & LAB EXAM 6:00-10:00 pm | May 12 |
| May 13 | May 14 LECTURE AT 1001 6:00-9:00 | May 15 LEC & LAB Muscles 6:00-10:00 | May 16 LEC & LAB Muscles 6:00-10:00 | May 17 LEC & LAB AT 1001 6:00-10:00 | May 18 LEC & LAB AT 1001 6:00-10:00 | May 19 |
| May 20 | May 21 HOLIDAY (Woot Woot!) | May 22 LEC & LAB AT 1001 6:00-10:00 | May 23 LEC & LAB EXAM 6:00-10:00 pm | May 24 | May 25 | May 26 |

LECTURE OUTLINE

(Subject to Change)

I. Introduction

A. Objectives of the course

II. Integumentary System

III. Skeletal System (Osseous connective tissue)

A. Review of Human Bones

(1) axial division

- (a) skull (cranium, facial bones)
- (b) hyoid bone
- (c) trunk (vertebrae, ribs, sternum)

(2) appendicular division

- (a) upper (pectoral) appendages
- (b) lower (pelvic) appendages

B. Muscular System

a) properties of skeletal muscle tissue

b) structure and function of skeletal muscles

C. Principle muscles of the body

(1) Muscles of facial expression & mm. that move the axial skeleton

(2) Muscles of upper extremity

- (a) shoulder joint
- (b) muscles moving the shoulder
- (c) muscles moving the upper arm
- (d) muscles moving the lower arm
- (e) muscles which move the hand
- (f) muscles which move the fingers and thumb (forearm/hand)

(3) Muscles of the lower extremity

- (a) hip joint
- (b) muscles which move the thigh
- (c) muscles which move the lower leg
- (d) muscles which move the foot and toes

SKELETAL SYSTEM AND JOINTS

You are responsible for the ligaments associated with the knee, shoulder, elbow, and hip. Models are available for this purpose.

The following is a list of the bones and their parts that you are required to know for lab. Please note that you should also be able to tell if major bones are from the right or left side, which end is proximal or distal and with which bone(s) they articulate.

Integument

Epidermis

| | | |
|------------------|-----------------|--------------------|
| stratum. corneum | stratum lucidum | stratum granulosum |
| stratum spinosum | stratum basale | |

Dermis

| | | |
|----------|-------------------------------|--|
| papillae | touch corpuscles (Meissner's) | |
|----------|-------------------------------|--|

Hypodermis

| | | |
|---------------------------|-----------------------|------------------|
| Adipose | lamellated corpuscles | |
| sudoriferus (sweat) gland | hair shaft | root |
| hair bulb | hair papilla | sebaceous glands |
| arrector pili mm | Pacinian corpuscles | |

1. Skull (see Appendix A)

A. Cranium

Frontal bone:

| | | |
|----------------|----------------------|-------------------------------|
| Sinuses | supra-orbital margin | supra-orbital notch (foramen) |
| coronal suture | | |

Parietal bone:

| | | |
|--------------------------------------|-------------------|-----------------|
| Squamosal suture | lambdoidal suture | sagittal suture |
| grooves of middle meningeal arteries | | |

Temporal bone:

| | | |
|-------------------------------------|------------------|-------------------|
| Mastoid process | mandibular fossa | zygomatic process |
| stylomastoid foramen | styloid process | petrous portion, |
| squamous portion | | |
| external auditory (acoustic) meatus | | |
| internal auditory (acoustic) meatus | | |

Occipital bone:

| | | |
|-----------------------------|--------------------|-----------------|
| Foramen magnum | occipital condyles | jugular foramen |
| hypoglossal (canal) foramen | | |
| groove of transverse sinus | | |
| groove of sigmoid sinus | | |

Sphenoid bone:

| | | |
|--------------------------|------------------|-----------------|
| Sinuses | foramen ovale | optic foramina, |
| foramen rotundum | foramen spinosum | sella turcica |
| superior orbital fissure | | |
| inferior orbital fissure | | |

Ethmoid bone:

| | |
|---------------------|------------------------------|
| Crista galli | cribriform foramina (plate), |
| perpendicular plate | |

B. Facial Bones

Maxilla:

| | | |
|-----------------------|------------------|-------------------|
| Sinuses | palatine process | alveolar process, |
| infraorbital foramina | | |

Mandible:

| | | |
|---------------------------------|------------------|----------------|
| Condylod process | coronoid process | ramus |
| alveolar border | angle | mental foramen |
| mandibular foramen | lingula | body |
| symphysis (mental protuberance) | | |

Nasal bones

Lacrimal bones

Inferior nasal conchae

Zygomatic bones

Vomer bone

Palatine bone

C. Ear Ossicles

Malleus

Incus

Stapes

(**Hammer, anvil and stirrup are NOT acceptable!)

Hyoid Bone

Greater horn

lesser horn

body

Vertebrae General features:

Body

superior articular surface

spine (spinous process)

transverse foramina (if present)

pedicle

transverse process

inferior articular surface

lamina

Types: (look up the structures unique to these vertebrae including Atlas and Axis)

Cervical

Thoracic

Lumbar

Sacrum:

Ala

body

anterior sacral foramina

posterior sacral foramina

Coccyx

Ribs:

Head

neck

tubercle

costal groove

(You are not responsible to be able to tell the ribs apart, except for the unique ones such as the floating ribs)

Sternum:

| | | |
|---------------|-----------------|---------------|
| Jugular notch | manubrium | sternal angle |
| Body | xiphoid process | |

Scapula:

| | | |
|---------------------------|--------------------|----------------------------|
| Vertebral (medial) border | | axillary (lateral) border, |
| glenoid fossa (cavity) | acromion | spine |
| supraspinous fossa | infraspinous fossa | inferior angle |
| subscapular fossa | coracoid process | |

Clavicle:

| | | |
|----------------------|------------------------|-----------------|
| Medial (sternal) end | lateral (acromial) end | conoid tubercle |
|----------------------|------------------------|-----------------|

Humerus:

| | | |
|-------------------|--------------------|-----------|
| Head | deltoid tuberosity | capitulum |
| coronoid fossa | olecranon fossa | trochlea |
| medial epicondyle | lateral epicondyle | |
| greater tubercle | lesser tubercle | |

Ulna:

| | | |
|-----------------------------|-----------|------------------|
| Semilunar (trochlear) notch | olecranon | coronoid process |
| radial notch | head | styloid process |

Radius:

| | | |
|-----------------|-------------------|------|
| Head | radial tuberosity | neck |
| styloid process | | |

Carpals (wrist bones):

| | | | |
|-------------------------|----------|-----------|----------|
| Scaphoid | Lunate | Trapezium | Capitate |
| Triquetral (triquetrum) | Pisiform | Trapezoid | Hamate |

Hand (Manus) Bones;

| | |
|-------------|--------------------------------------|
| Metacarpals | phalanges (distal, middle, proximal) |
|-------------|--------------------------------------|

Coxal (Hip) Bones:

| | | |
|--------------------------------|-------------------------------|-------------------|
| Ilium | ischium | pubis |
| symphysis pubis | acetabulum | obturator foramen |
| greater sciatic notch | lesser sciatic notch | ischial spine |
| anterior superior iliac spine | anterior inferior iliac spine | |
| posterior superior iliac spine | | |
| posterior inferior iliac spine | | |
| ischial tuberosity | | |

Femur:

| | | |
|--------------------|--------------------|---------------------|
| Head | linea aspera | neck |
| lateral condyles | medial condyle | intercondylar fossa |
| lateral epicondyle | medial epicondyle, | |
| greater trochanter | lesser trochanter | |

Patella:

| | |
|------|------|
| Base | apex |
|------|------|

Tibia:

| | | |
|-----------------|------------------------|-------------------|
| Lateral condyle | medial condyle | tibial tuberosity |
| malleolus | intercondylar eminence | medial |

Fibula:

| | |
|------|-------------------|
| Head | lateral malleolus |
|------|-------------------|

Tarsal (Ankle) Bones:

| | | | |
|-----------------------------------|---------------------------------|--------|-----------|
| Talus, 1st, 2nd, 3rd cuneiform | navicular | cuboid | calcaneus |
| | (medial, intermediate, lateral) | | |

Foot Bones:

| | |
|-------------|--------------------------------------|
| Metatarsals | phalanges (distal, middle, proximal) |
|-------------|--------------------------------------|

Model of Bone:

| | | |
|------------|-----------------|------------------|
| Periosteum | lamellae | Sharpey's fibres |
| osteocyte | Volkman's canal | osteon |

The following is a list of structures associated with the knee, shoulder, elbow, and hip joints which you are responsible to know:

Knee:

| | |
|---------------------------------------|------------------------------|
| anterior cruciate ligament | posterior cruciate ligament, |
| medial meniscus | lateral meniscus |
| medial (tibial) collateral ligament | |
| lateral (fibular) collateral ligament | |
| posterior menisofemoral ligament | |
| quadriceps tendon | |
| patellar ligament | |

Shoulder:

| | |
|---------------------------------------|---|
| acromioclavicular ligament | coracoclavicular (conoid & trapezoid) lig |
| coracoacromial ligament | coracohumeral ligament |
| long head of biceps tendon | transverse humeral retinaculum |
| superior transverse scapular ligament | |

Elbow:

| | |
|----------------------------|-----------------------------|
| medial collateral ligament | lateral collateral ligament |
| annular ligament | |

Hip:

| | |
|----------------------|------------------------|
| iliofemoral ligament | ischiofemoral ligament |
| pubofemoral ligament | |

MUSCULAR SYSTEM

This section lists what you need to know for both the cat and the human in the lab portion of the course. In addition to being able to identify muscles, you are responsible for origin(s), insertion(s) and action(s) for the major muscle groups in the human.

The only tendon you should know is the Achilles (calcaneal) tendon.

The following is a list of muscles you should know in the human:

Head/Neck Region

| | |
|---------------------------------|---------------------|
| masseter | sternocleidomastoid |
| temporalis (temporoparietal) | sternothyroid |
| buccinator | sternohyoid |
| orbicularis oris | thyrohyoid |
| orbicularis oculi | stylohyoid |
| frontalis (occipitofrontalis) | anterior scalene |
| occipitalis (occipitofrontalis) | middle scalene |
| zygomaticus (major + minor) | posterior scalene |
| platysma | levator scapulae |

Thoracic/Abdominal Region

| | |
|----------------------------|----------------------------------|
| pectoralis minor | rectus abdominis |
| pectoralis major | transversus abdominis |
| internal abdominal oblique | serratus anterior |
| external abdominal oblique | intercostals (internal/external) |

Back Region

| | |
|------------------|--------------------|
| latissimus dorsi | rhomboides major |
| erector spinae | trapezius |
| rhomboides minor | quadratus lumborum |

Upper Extremity

| | |
|-------------------------------------|---|
| teres minor | extensor carpi radialis longus |
| teres major | extensor carpi radialis brevis |
| supraspinatus | brachioradialis |
| infraspinatus | extensor digitorum |
| subscapularis | extensor carpi ulnaris |
| deltoid | flexor pollicis brevis |
| Serratus anterior | abductor pollicis brevis |
| Pectoralis major | extensor pollicis brevis |
| Pectoralis minor | extensor pollicis longus |
| biceps brachii (long & short heads) | adductor pollicis |
| brachialis | abductor pollicis longus |
| coracobrachialis | supinator |
| Pronator teres | pronator quadratus |
| Flexor carpi radialis | Opponens pollicis |
| Palmaris longus | Triceps brachii (long, lateral, medial) |

Flexor carpi ulnaris
Flexor digitorum superficialis
Flexor digitorum profundus

abductor digiti minimi
flexor digiti minimi
opponens digiti minimi
lumbricals

Lower Extremity

Iliacus
psoas major
psoas minor
piriformis
iliopsoas
tensor fasciae latae
sartorius
superior gemellus
inferior gemellus
obturator internus
gluteus maximus
gluteus medius
gluteus minimus
rectus femoris
vastus lateralis
vastus medialis
vastus intermedius
pectineus
adductor longus
adductor brevis
adductor magnus
gracilis

semitendinosus
semimembranosus
biceps femoris (long & short heads)
tibialis anterior
extensor hallucis longus
extensor digitorum
peroneus longus
peroneus brevis
gastrocnemius
soleus
plantaris
popliteus
flexor hallucis longus
tibialis posterior
flexor digitorum longus
iliotibial band (ITB)
inguinal ligament