

BIOLOGY 2011
HUMAN ANATOMY - MSK
(“Where one has to work their phalanges to the periosteum!”)
Spring Online 2020

LAB MANUAL



BIOLOGY 2011
HUMAN ANATOMY- MSK
Spring Online 2020

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Required Texts:

1. Principles of Human Anatomy (14e). Author: Tortora, G. (2017)
2. Atlas of Human Anatomy (7e.). Author: Netter (2017)
3. Laboratory Manual for Biology 2020. Donna Newhouse (2020)

Teaching Assistants:

****Mark Breakdown:**

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|----------|--------------|---|
| Lecture: | 2 Exams: | 1. MT Exam: Integument & Bones [30%]
(May 11th; 6:00 pm)** |
| | | 2. Final Exam: Bones and Muscles [30%]
(May 23rd; 6:00 pm)** |
| Lab: | 2 Lab Exams: | 1. Integument & Bones (May 11th; 8:00 pm)** |
| | | 2. Bones & Muscles (May 23rd; 8:00 pm)** |

****Dates/times are subject to change**

General Information: Lectures

There will be no formal lectures scheduled. All lectures will be prerecorded and uploaded to the D2L site. These recorded lectures can be viewed anywhere and at your leisure. I would suggest carving out a minimum of three hours a day (make it a routine) to review the lectures and study to the lab.

There are a total of two lecture exams (MT & Final) which will take place online via D2L at the scheduled time/date noted above. The two lecture exams will consist of a variety of questions (mostly fill-in-the-blank type, T/F, MC). The Midterm (MT) Exam will cover information from May 1st – May 8th, and the Final Exam will cover information from MT – May 22nd.

General Information: Laboratory

Labs will take place online as well. The D2L Labs will be populated with pertinent images for you to review and identify the various structures that are listed in the lab section below. The majority of these images will be used for testing purposes, but please note, there will be some images you will not have seen previously.

Being presented with an image that you have not seen previously, allows me to assess your understanding of anatomical relationships and your ability to “apply” your knowledge.

There will be a total of two lab exams. Each lab exam will include have structures on various images “tagged” and students will have to identify the structures. Students will have 30 seconds to identify each structure. For example, if there are 120 structures labeled on the lab exam, then students will have 60 minutes to complete the exam.

I welcome you to Biology 2011 (Spring 2020) and hope that your experience in this online human anatomy course 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 – Academic Integrity

Academic Dishonesty:

The University takes a most serious view of offences against academic honesty such as plagiarism, cheating and impersonation. Penalties for dealing with such offences will be strictly enforced.

The "Code of Student Behaviour and Disciplinary Procedures" including sections on plagiarism and other forms of misconduct may be found on the Lakehead University Senate website. See the Code under Policies - Student Related in the University Policies at policies.lakeheadu.ca.

The following rules shall govern the treatment of candidates who have been found guilty of attempting to obtain academic credit dishonestly.

(a) The minimum penalty for a candidate found guilty of plagiarism, or of cheating on any part of a course will be a zero for the work concerned.

(b) A candidate found guilty of cheating on a formal examination or a test, or of serious or repeated plagiarism, or of unofficially obtaining a copy of an examination paper before the examination is scheduled to be written, will receive zero for the course and may be expelled from the University.

Students disciplined under the Code of Student Behaviour and Disciplinary Procedures may appeal their case through the Judicial Panel.

Academic dishonesty definitions, examples, and disciplinary procedures are outlined in FULL in the university regulations and policies below.

University Regulation – IX Academic Misconduct

<http://navigator.lakeheadu.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&catalogid=21&chapterid=3506&loaduserredits=False>

Student Code of Conduct:

<https://www.lakeheadu.ca/faculty-and-staff/policies/student-related/code-of-student-behaviour-and-disciplinary-procedures>

****Subject to Change**

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

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)
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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

pedicle

lamina

superior articular surface

transverse process

spine (spinous process)

inferior articular surface

transverse foramina (if present)

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
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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)
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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
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Tibia:

Lateral condyle malleolus	medial condyle intercondylar eminence	tibial tuberosity medial
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Fibula:

Head	lateral malleolus
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Tarsal (Ankle) Bones:

Talus, 1st, 2nd, 3rd cuneiform (medial, intermediate, lateral)	navicular	cuboid	calcaneus
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Foot Bones:

Metatarsals	phalanges (distal, middle, proximal)
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Model of Bone:

Periosteum osteocyte	lamellae Volkmann's canal	Sharpey's fibres osteon
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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 meniscomfemoral 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)	sternozyoid
buccinator	sternothyroid
orbicularis oris	thyrozyoid
orbicularis oculi	stylozyoid
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