

BIOLOGY 2012
HUMAN ANATOMY - Internal
(“Where one has to work their phalanges to the periosteum!”)
Spring 2019

LAB MANUAL



BIOLOGY 2012
HUMAN ANATOMY - Internal
Spring 2019

Instructor: Donna Newhouse, M.Sc., Ph.D(c)

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Required Texts:

1. Principles of Human Anatomy (12e). Author: Tortora, G. (2016)

2. Atlas of Human Anatomy (4e.). Author: Netter (2015)

3. "Inhouse" Laboratory Manual for Biology 2012. Donna Newhouse (2019)

Teaching Assistants:

Jonathon Avella

****Mark Breakdown:**

Lecture: 2 Exams:

1. Midterm: [30%]

(June 7; 6:00 pm)

2. Final Exam: [30%]

(June 15; 6:00-8:00 pm)**

Lab: 1 lab exams:

1. Lab Exam [40%]

(June 14; 8:00-10:00 pm)**

****Dates are subject to change**

General Information: Lecture

There are a total of two lecture and one 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 150-200 marks. Two hours will be allotted for the exams. The Midterm Exam will cover information from May 27 to June 4, and the Final Exam will cover information from MT exam to June 14th.

General Information:Laboratory Examinations:

There will be one Lab exam. The 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 models, radiological, and histological materials.

I welcome you to Biology 2012 (Spring 2019) 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 2012 - 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 (...Doug Ford...Justin Trudeau!!!). 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!)

Please note: This timetable is SUBJECT TO CHANGE

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
May 26	May 27 LECTURE 6:00-9:00 pm	May 28 LAB 6:00-9:00 pm	May 29 LECTURE 6:00-8:00 pm LAB 8:00-10:00 pm	May 30 LECTURE 6:00-8:00 pm LAB 8:00-10:00 pm	May 31 LECTURE 6:00-8:00 pm	June 1
June 2	June 3 LECTURE 6:00-8:00 pm LAB 8:00-10:00 pm	June 4 LECTURE 6:00-8:00 pm LAB 8:00-10:00 pm	June 5 LECTURE 6:00-8:00 pm LAB 8:00-10:00 pm	June 6 LECTURE 6:00-8:00 pm	June 7 MT EXAM 6:00-7:45 pm	June 8
June 9	June 10 LECTURE 6:00-8:00 pm LAB 8:00-10:00 pm	June 11 LECTURE 6:00-8:00 pm LAB 8:00-10:00 pm	June 12 LECTURE 6:00-8:00 pm LAB 8:00-10:00 pm	June 13 LECTURE 6:00-8:00 pm LAB 8:00-10:00 pm	June 14 LECTURE 6:00-8:00 pm FINAL LAB EXAM 8:00-10:00 pm	June 15 FINAL LEC EXAM 6:00-8:00 pm

LECTURE OUTLINE

(Subject to Change)

I. Nervous System

A. Organization

- (1) anatomical classification
 - (a) central nervous system
 - (b) peripheral nervous system
- (2) functional classification
 - (a) cerebrospinal fluid
 - (b) autonomic system

B. Gross anatomy

- (1) central nervous system
 - (a) meninges
 - (b) major regions of the brain
 - (c) spinal cord
- (2) peripheral nervous system
 - (a) cranial nerves
 - (b) spinal nerves
- (3) autonomic nervous system
 - (a) sympathetic division
 - (b) parasympathetic division

INTERNAL ANATOMY

II. Respiration

- A. General comments
- B. Nose
- C. Sinuses of skull
- D. Pharynx
- E. Larynx
 - (1) location and function
 - (2) cartilages
 - (3) vocal cords
 - (4) muscles
- F. Trachea
- G. Bronchi
- H. Lungs
- I. Muscles and nerves involved in breathing

III. Circulatory System

A. Microscopic anatomy (vascular connective tissue)

- (1) plasma
- (2) formed elements (erythrocytes, leukocytes, thrombocytes)

B. General functions

- (1) transportation
- (2) protection
- (3) maintenance of homeostasis

C. Heart

- (1) pericardium
- (2) layers of the heart (epicardium, myocardium, endocardium)
- (3) chambers and valves
- (4) 'neuromuscular' tissue
- (5) nerve supply to the heart

D. Arterial blood vessels

- (1) aorta
- (2) arteries of the head and neck
- (3) arteries of upper limb
- (4) arteries of abdomen
- (5) arteries of lower limb

E. Venous blood vessels

- (1) veins of head and neck
- (2) veins of thorax
- (3) veins of upper limb (deep and superficial)
- (4) veins of lower limb (deep and superficial)
- (5) veins of the pelvis and abdomen (hepatic portal system)

IV. Digestion

A. Functions

B. General review of structures involved

C. Mouth

- (1) salivary glands
- (2) teeth
- (3) muscles of mastication

D. Pharynx

E. Esophagus

F. Stomach

G. Liver

H. Pancreas

I. Small intestine

J. Large intestine

K. Rectum, anus

V. Reproductive System

A. General comments

B. Male reproductive structures

- (1) scrotum
- (2) testes (enclosing capsule, seminiferous tubules)
- (3) epididymis
- (4) vas deferens
- (5) seminal vesicles
- (6) prostate gland
- (7) bulbourethral glands
- (8) urethra
- (9) penis

C. Female reproductive structures

- (1) ovaries
- (2) fallopian tubes
- (3) uterus
- (4) vagina
- (5) external structures

VI. Urinary System

A. Functions

B. Kidney

- (1) gross anatomy
- (2) microscopic anatomy

C. Ureter

D. Bladder

E. Urethra

VII. Special Sensory Structures

A. Structure of the eye

- (1) orbit
- (2) eyelids
- (3) lacrimal apparatus
- (4) extrinsic muscles
- (5) internal structure

THE CNS, PNS, INTERNAL ANATOMY and SPECIAL SENSES

The Nervous System - Structures you are responsible to know

1. Twelve cranial nerves

2. Cerebrum: frontal lobe, parietal lobe, temporal lobe, occipital lobe, longitudinal cerebral fissure, central sulcus

corpus callosum: genu, body, splenium, anterior commissure, intermediate commissure (interthalamic adhesion), posterior commissure

thalamus

hypothalamus

choroid plexus

pineal gland (body)

optic chiasm

pituitary gland: infundibulum

mammillary body

3. Cerebellum: arbor vitae

4. Brainstem: medulla oblongata, pons, midbrain (cerebral peduncle)

5. Spinal cord

gray matter: ventral (anterior) horn, lateral horn, dorsal (posterior) horn, commissure

white matter

anterior white commissure

ventral median fissure

dorsal median sulcus

central canal

epidural space (fat in epidural space)

dura mater

arachnoid mater

subarachnoid space

pia mater

ventral root

dorsal root

spinal ganglion (dorsal root ganglion)

ventral ramus

dorsal ramus

spinal nerve

vertebral artery/vein

superficial peroneal n

deep peroneal n.

common peroneal n.

saphenous n.

sciatic n.

posterior tibial n.

iliohypogastric n.

femoral n.

obturator n.

intercostal nn.

phrenic n.

axillary n.

median n.

ulnar n.

radial n.

musculocutaneous n.

cervical plexus mental n.

brachial plexus infraorbital n.

lumbar plexus supraorbital n.

sacral plexus facial n.

sympathetic trunk

rami communicans (gray and white)

denticulate ligament

ligamentum flavum

INTERNAL ANATOMY

Digestive, Respiratory, Urinary, Reproductive and Cardiovascular Systems and Special Senses

Internal Anatomy: Models

You are responsible for all of the visceral organs found in the body. You should familiarize yourself with structures specific to certain viscera.

Structures of the male sexual organ:

prepuce	external anal sphincter (m)	internal anal sphincter
cremaster m.	pyramidalis m.	rectus abdominis m.
rectum	ureter	urinary bladder
urethra	prostate gland	prostatic urethra
seminal vesicle	ductus (vas) deferens	spermatic cord
scrotum	corpus spongiosum	testis
epididymis	corpus cavernosum	
penis	pampiniform venous plexus	
glans penis		

Structures of the female sexual organ:

ureter	external anal sphincter	internal anal sphincter
pyramidalis m.	rectus abdominis m.	rectum
labium majora	labium minora	clitoris
round ligament	ovarian ligament (proper)	fallopian tube
broad ligament	ovary	vagina
uterus	cervix	fornix of vagina
urinary bladder	urethra	

Structures of the kidney:

renal a.	renal v.	medulla
cortex	renal pyramid	renal papilla
renal pelvis	major calyces	minor calyces
ureter	loop of Henle	interlobular a.
interlobar v.	arcuate a.	afferent arteriole
efferent arteriole	arcuate v.	glomerulus

Structures of the liver:

right lobe	left lobe	caudate lobe
quadrate lobe	falciform ligament	gallbladder

Structures of the Intestines:

duodenum	jejunum	ileum	rectum
cecum	appendix	ileocecal valve	
ascending colon	transverse colon	descending colon	
haustra	greater omentum	right (hepatic) colic flexure	
epiploic appendices	sigmoid colon	left (splenic) colic flexure	

Structures of the Larynx:

Hyoid, thyroid cartilage, cricoid cartilage, arytenoid cartilage, corniculate (Santorini) cartilage, cuneiform (Wrisberg's) cartilage, tracheal cartilages

Structures of the lung:

superior lobe	middle lobe	inferior lobe
oblique fissure	horizontal fissure	lingula of lung
apex	cardiac notch	hilus

Miscellaneous structures:

spleen, thymus gland, thyroid gland, adrenal glands, inguinal ligament

THE CIRCULATORY SYSTEM

Structures of the **Human Heart** (that you are responsible for)

atrium	
auricle	
ventricle	
apex	
base	
superior vena cava	
inferior vena cava	
ascending aorta	fossa ovalis (remnants)
arch of aorta	tricuspid valve
descending aorta	bicuspid (mitral) valve
brachiocephalic a. (trunk)	semilunar valve of pulmonary a.
left common carotid a.	semilunar valve of aorta
left subclavian a.	papillary mm.
ligamentum arteriosum	chordae tendineae
right coronary a.	trabeculae
left coronary a.	
posterior interventricular a. (post. descending br. of rt. coronary a.)	
anterior interventricular a. (ant. descending br. of lt. coronary a.)	
circumflex a.	
great cardiac v.	pectinate m.
coronary sinus	moderator band
pulmonary trunk	trachea
pulmonary aa.	bifurcation of trachea (carina)
pulmonary vv.	right bronchus
brachiocephalic vv.	left bronchus

Vessels of the lower extremities:

external iliac a.	external iliac v.
internal iliac a.	femoral v.
obturator a.	greater saphenous v.
superior gluteal a.	lesser saphenous v.
inferior gluteal a.	
internal pudendal a.	
femoral a.	
deep femoral a. (profundus)	
popliteal a.	
posterior tibial a.	
anterior tibial a.	
dorsalis pedis a.	

Vessels of the upper extremities:

axillary a.
brachial a.
radial a.
ulnar a.
anterior humeral circumflex a.

superficial palmar br. of radial a.
princeps pollicis a.
common palmar digital aa.
proper palmar digital aa.
superficial palmar arch

Vessels of the head and neck:

superficial temporal a.
maxillary a.
common carotid a.
subclavian a.
internal carotid a.

internal jugular v.
external jugular v.

Vessels of the abdomen:

left gastric a.
superior mesenteric a.
celiac trunk
splenic v.
abdominal aorta
renal v.
testicular (ovarian) a.
common iliac v.
inferior mesenteric v.

hepatic a.
superior mesenteric v.
splenic a.

renal a.
common iliac a.
inferior mesenteric a.

SENSORY STRUCTURES

Structures of the eye:

sclera	cornea	retina
choroid	iris	lens
pupil	vitreous humor	optic papilla
macula	fovea centralis	retinal vv.
retinal aa.	superior oblique m.	inferior oblique m.
lateral rectus m.	medial rectus m.	superior rectus m.
inferior rectus m.	lacrimal gland	optic nerve

Structures of the ear:

auricle	oval (vestibular) window
external acoustic meatus	round (cochlear) window
tympanic membrane	lateral semicircular canal
malleus (a) head (b) neck (c) manubrium	
incus (body, short crus, long crus, lenticular process of incus)	
stapes (head, anterior crus, posterior crus, base)	
posterior semicircular canal	cochlea
vestibulocochlear n. (CN VIII)	internal acoustic meatus
anterior (superior) semicircular canal	tensor tympani m.