BIOLOGY 2012
HUMAN ANATOMY - Internal Anatomy
Spring Online 2024

COURSE SYLLABUS/LAB MANUAL

BIOLOGY 2012
HUMAN ANATOMY - Internal
Spring 2024

Instructor: Donna Newhouse
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Required Texts:
1. Principles of Human Anatomy (15e). Author: Tortora, G. (2020)

2. Atlas of Human Anatomy (4e.). Author: Netter (2017)

3. "Inhouse" Laboratory Manual for Biology 2012. Donna Newhouse (2024)

Teaching Assistants:

****Mark Breakdown:**

Lecture:	2 Exams:	1. Midterm: [30%] (June 7; 6:00 pm)
		2. Final Exam: [40%] (June 15; 6:00pm)**
Lab:	1 lab exams:	1. Lab Exam [30%] (June 15; ~8:00 pm)**

****Dates are subject to change**

Course Description:

Anatomical systems/topics covered are the nervous, cardiovascular, respiratory, digestive, urinary and reproductive systems.

General Information: Lectures

There will be no formal lectures scheduled. All lectures will be prerecorded and uploaded to the D2L course site. These recorded lectures can be veiwed 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 content. Below I have laid out a general schedule to help keep students on track. Please note that any Greek or Latin terms that will be assessed are strictly the terms that have been covered in lecture recordings/slides.

General Information: Lecture Examinations

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 - Identify, T/F, MCQ). The midterm (MT) and Final exams will be approximately 100-200 questions. **The allotment of time for these exams is based on the Teaching Commons guidelines of time/type of question.** For example, 1 minute is alloted for each MCQ, 15 seconds per True/False questions, 30 seconds for FITB – Identify, etc. Thus, the length of exams will be dependent of the number of questions and as well as the type of questions.There will be a strict time limt for both exams.

The Midterm (MT) Exam will cover information from:

Assigned Textbook Reading: Introduction to Human Body – Chapter 1 (Sections 1.1-1.7)
Lecture: Nervous Tissue
Lecture: Brain & Cranial nn. – Pt. 1 (Brain)
Lecture: Brain & Cranial nn. – Pt. 2 (Cranial nn.)
Lecture: Spinal Cord & Spinal nn – Pt.1 (Spinal cord)
Lecture: Spinal Cord & Spinal nn – Pt.2 (Spinal nn.)
Lecture: Cardiovascular System – Pt. 1 (Blood)

The Final Exam will cover information from:

Lecture: Cardiovascular System – Pt. 2 (Heart)
Lecture: Cardiovascular System – Pt. 3 (Arteries) & Pt. 4 (Veins)
Lecture: Respiratory System
Lecture: Digestive System
Lecture: Reproductive System - ♀
Lecture: Reproductive System - ♂
Assigned Textbook Reading: Urinary System – Chapter 25 (Sections 25.1-25.5)

The MT & Final exams will assess the information covered within the recorded lectures and ASSIGNED readings from the textbook.

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***.
Identify (label) the structures listed in the lab manual on the images.

General Information: Laboratory Examinations:

There will be one Lab exam completed online. The lab material will be images of models, images of cadaveric specimens, etc. The lab exam will require students to "identify structure labeled A, B, C, etc". Thirty seconds is alloted per question. There will be a strict exam time limit. Ensure that you are spending appropriate amounts of time reviewing the lab content (see timetable as a guide) and do not leave it until the last week to prepare for the lab exam.

Online Examinations:

Please note that it is very important to ensure you have a good internet connection and a fairly fast internet download speed, particularly for the online exams.

If there are any issues during the online exams (connectivity, etc.) students must contact me during the exam.

If you cannot write an exam on the scheduled day/time, then please contact me in advance via email (donna.newhouse@lakeheadu.ca).

All exams for this course are CLOSED BOOK, meaning that one cannot consult notes, textbooks, the internet, or any resource of any description (including another student writing the exam) while writing an exam.

Lakehead University takes Academic Integrity VERY SERIOUSLY.

Course and University Policies

Biology 2012 - Course 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. Exams will not be returned, however, if requested, I will review a students exam and provide feedback on their performance.

2. If there are any issues during the online exams (connectivity, etc.) and students feel that their performance was negatively affected, you will be required to take an oral exam (online via Zoom) within two days of the scheduled exam.

3. Students experiencing any issues during the online exams (connectivity, etc.) must contact Donna Newhouse ((807) 474-9016) DURING the exam to make me aware of the issues.

4. All exams for this course are CLOSED BOOK, therefore you cannot consult your notes, textbook, internet, or any resource of any description (including other students) while writing an exam.

5. In the event that a student has to miss a lab or lecture exam for emergency or medical reasons, it will be the student's responsibility to get in touch with Donna Newhouse [(807) 474-9016] prior to the scheduled exam. Failure to comply will result in a grade of zero for the exam.

6. Images provided are NOT to be copied or redistributed for any purposes.

7. 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. Siddall (...Doug Ford...Justin Trudeau!!!). Issues or problems should be resolved at the lowest level possible. (Dr. Siddall shouldn't have to resolve the problem of a half mark injustice on a lab exam!)

Behavioral standards:
Please refer to the Student Code of Conduct - Academic Integrity.

Netiquette:
Please communicate with me via your Lakehead e-mail account. It is appropriate to address me as Donna or Professor Newhouse. Always use **Biology 2012 SDE 2024 in the subject line** of any email you send to me. I will respond to all e-mails in a timely fashion (usually within 24 hours, except for weekends). If you would like to arrange to meet via a Zoom call for purposes of office hours, I am happy to do so, but I would ask that students contact me in advance, so that we can agree to meet at a mutually convenient date/time.

Academic Integrity Statement:
I understand and agree that:
(1) Unless otherwise allowed by the course instructor, I must complete the assignments in this course without the assistance of anyone else.

(2) Unless otherwise allowed by the course instructor, I must not access any sources or materials (in print, online, or in any other way) to complete any course exam.

I further understand and agree that, if I violate either of these two rules, or if I provide any false or misleading information about my completion of course assignments or exams, I may be prosecuted under the Lakehead University Student Code of Conduct – Academic Integrity, which requires students to act ethically and with integrity in academic matters and to demonstrate behaviours that support the University's academic values.

Copyright:

All instructional, reference, and administrative materials prepared for this course are protected in their entirety by copyright. Students are expected to comply with this copyright by only accessing and using the course materials for personal educational use related to the course, and that the materials cannot be shared in any way, without the written authorization of the course instructor. If this copyright is infringed in anyway, students may be prosecuted under the Lakehead University Student Code of Conduct – Academic Integrity, which requires students to act ethically and with integrity in academic matters and to demonstrate behaviours that support the University's academic values.

Copyright Compliance:

I understand and agree that all instructional, reference, and administrative materials to which I am given access in this course (the "course materials"), whether they consist of text, still or kinetic images, or sound, whether they are in digital or hard copy formats, and in whatever media they are offered, are protected in their entirety by copyright, and that to comply with this copyright and the law

(1) I may access and download the course materials only for my own personal and non-commercial use for this course; and

(2) I am not permitted to download, copy, or store (in any medium) any text, image, or sound component of the course materials for any other purpose whatsoever, or to forward or share, transmit, broadcast, show, post or play in public, adapt, or change in any way any text, image, or sound component of the course materials, except as expressly authorized, and only to the extent authorized, in writing, by the course instructor."

I further understand and agree that, if I infringe the copyright of the course materials in any way, I may be prosecuted under the Lakehead University Student Code of Conduct – Academic Integrity, which requires students to act ethically and with integrity in academic matters and to demonstrate behaviours that support the University's academic values.

Regulations
It is the responsibility of each student registered at Lakehead University to be familiar with, and comply with all the terms, requirements, regulations, policies

and conditions in the Lakehead University Academic Calendar. This includes, but is not limited to, Academic Program Requirements, Academic Schedule of Dates, University and Faculty/School Policies and Regulations and the Fees and Refund Policies and Schedules (Lakehead University Regulations webpage, 2023-24).

Academic Integrity
A breach of Academic Integrity is a serious offence. The principle of Academic Integrity, particularly of doing one's own work, documenting properly (including use of quotation marks, appropriate paraphrasing and referencing/citation), collaborating appropriately, and avoiding misrepresentation, is a core principle in university study. Students should view the Student Code of Conduct - Academic Integrity for a full description of academic offences, procedures when Academic Integrity breaches are suspected and sanctions for breaches of Academic Integrity.

Supports for Students – there are many resources available to support students. These include but are not limited to:

- Health and Wellness
- Student Success Centre
- Student Accessibility Centre
- Library
- Lakehead International
- Indigenous Initiatives

Lakehead University is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities and/or medical conditions to ensure they have an equitable opportunity to participate in all of their academic activities. If you are a student with a disability and think you may need accommodations, you are strongly encouraged to contact Student Accessibility Services (SAS) and register as early as possible. For more information, please contact Student Accessibility Services (SC0003, 343-8047 or sas@lakeheadu.ca)

I welcome you to Biology 2012 (Spring 2024) 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!

Please note: This timetable is a study "guide" timetable.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
May 22	**May 27** **Assigned Textbook Reading:** Introduction to Human Body – Chapter 1 (Sections 1.1-1.7)	**May 28** **Introductory Zoom Meeting (6:00 pm)** **Lecture:** Nervous Tissue	**May 29** **Lecture:** Brain & Cranial nn. – Pt. 1 (Brain) **Lab**	**May 30** **Lecture:** Brain & Cranial nn. – Pt. 2 (Cranial nn.) **Lab**	**May 31** **Lecture:** Spinal Cord & Spinal nn – Pt.1 (Spinal cord) **Lab**	**June 1**
June 2	**June 3** **Lecture:** Spinal Cord & Spinal nn – Pt.2 (Spinal nn.)	**June 4** **Lecture:** Cardiovascular System – Pt. 1 (Blood) **Lab**	**June 5** **Lecture:** Cardiovascular System – Pt. 2 (Heart) **Lab**	**June 6** **Lecture:** Cardiovascular System – Pt. 3 (Arteries) & Pt. 4 (Veins) **Lab**	**June 7** **MT EXAM** **6:00 pm** ***see lab manual (pg 2).**	**June 8**
June 9	**June 10** **Lecture:** Respiratory System **Lab**	**June 11** **Lecture:** Digestive System **Lab**	**June 12** **Lecture:** Reproductive System - ♀	**June 13** **Lecture:** Reproductive System - ♂ **Lab**	**June 14** **Assigned Textbook Reading:** Urinary System – Chapter 25 (Sections 25.1-25.5)	**June 15** **FINAL LEC EXAM 6:00 pm** **FINAL LAB EXAM ~8:00 pm (start time is dependent on the length of the Final Exam)**
June 16	**June 17**	**June 18**	**June19**			

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

sympathetic trunk
rami communicans (gray and white)
denticulate ligament
ligamentum flavum

vertebral artery/vein
superficial peroneal n
deep peroneal n.
common peroneal n.
saphenous n.
sciatic n.
tibial 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
brachial plexus
lumbar plexus
sacral plexus

mental n.
infraorbital n.
supraorbital n.
facial n.

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

Structures of the female sexual organ:

ureter	external anal sphincter	internal anal sphincter
urethra	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		

Structures of the kidney:

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

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
arch of aorta
thoracic aorta
abdominal aorta
brachiocephalic trunk
L/R common carotid a.
L/R subclavian a.
ligamentum arteriosum
R. coronary a.
L. coronary a.
posterior interventricular a.
anterior interventricular a.
circumflex a.
great cardiac v.
coronary sinus
pulmonary trunk
pulmonary vv.
brachiocephalic vv.
fossa ovalis (remnants)
tricuspid valve
bicuspid (mitral) valve
semilunar valve of pulmonary a.
semilunar valve of aorta
papillary mm.
chordae tendineae
trabeculae carnae
pectinate m.
moderator band
trachea
pulmonary aa.
bifurcation of trachea (carina)
right bronchus
left bronchus
middle cardiac v.

Vessels of the lower extremities:

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

Vessels of the upper extremities:

axillary a.
brachial a.
radial a.
ulnar a.
anterior humeral circumflex a.
superficial palmar br. of ulnar 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.
external carotid a.
internal jugular v.
external jugular v.

Vessels of the abdomen:

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

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.