STATE UNIVERSITY OF NEW YORK
COLLEGE OF TECHNOLOGY
CANTON, NEW YORK

MASTER SYLLABUS

BIOL218: Human Anatomy and Physiology II

CIP Code: 26.0499
For assistance determining CIP Code, please refer to this webpage
https://nces.ed.gov/ipeds/cipcode/browse.aspx?y=55
or reach out to Sarah Todd at todds@canton.edu

Created by: Ron Tavernier
Updated by: William Rivers

School of Science, Health, and Criminal Justice
Science Department
Spring 2024

A. TITLE: Human Anatomy and Physiology II

B. COURSE NUMBER: BIOL218

C. CREDIT HOURS (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity):

 # Credit Hours: 4
 # Lecture Hours __3_ per Week
 # Lab Hours _3__ Week
Other ___ per Week

Course Length (# of Weeks): 15

D. WRITING INTENSIVE COURSE: No

E. GER CATEGORY:
GER 5: Natural Sciences and Scientific Reasoning

F. SEMESTER(S) OFFERED: Fall, Winter, Spring, Summer

G. COURSE DESCRIPTION:

This is the second in a sequence of two courses that studies the detailed anatomy and physiology of the human body. Topics include the anatomy and physiology of the endocrine, cardiovascular, lymphatic, respiratory, digestive, urinary, and reproductive systems. Also the subjects of the immune system, metabolism, fluid-electrolyte-acid-base balance, and pregnancy and development will be covered. The laboratory will include a dissection of the cat.

H. PRE-REQUISITES: Human Anatomy & Physiology I (BIOL 217) or equivalent or permission of instructor.
CO-REQUISITES:

I. STUDENT LEARNING OUTCOMES:

Course Student Learning Outcome [SLO]	***PSLO***	***GER***	***ISLO***
a. Identify and name the major organs and associated structures of the endocrine, cardiovascular, lymphatic, respiratory, digestive, urinary and reproductive systems.			**5. Industry, Professional, Discipline Specific Knowledge and Skills**
b. List and describe the functions of the major endocrine system hormones. Describe the mechanical and electrical events of the heart and the regulation of these events. Explain the regulation and blood flow patterns for			**5. Industry, Professional, Discipline Specific Knowledge and Skills**

the arterial and venous systems.			**5. Industry, Professional, Discipline Specific Knowledge and Skills**
c. Analyze the composition and describe the functions of blood. Explain the process of blood typing and the implications for blood transfusions. List and describe the functions of the lymphatic organs and tissues. Describe the division of the immune system and their functions.			**5. Industry, Professional, Discipline Specific Knowledge and Skills**
d. Explain the mechanics of breathing, transport of respiratory gases, gas exchange and the regulation of these events. Explain the digestive processes of the digestive organs and the regulation of these processes			**5. Industry, Professional, Discipline Specific Knowledge and Skills**
e. Describe the process of urine formation and explain the regulation of this process. Describe the events of the male and female reproductive cycles and how these events are regulated.			**5. Industry, Professional, Discipline Specific Knowledge and Skills**
f. Demonstrate an understanding of the methods scientists use to explore natural phenomena, including observation, hypothesis development, measurement and data collection, experimentation, evaluation of evidence, and employment of data analysis or mathematical modeling; and application of scientific data, concepts, and models in one of the natural sciences.		**GER 5**	**5. Industry, Professional, Discipline Specific Knowledge and Skills**

KEY	Institutional Student Learning Outcomes [ISLO 1 – 5]
ISLO #	ISLO & Subsets
1	**Communication Skills** Oral [O], Written [W]
2	**Critical Thinking** *Critical Analysis [CA] , Inquiry & Analysis [IA] , Problem Solving [PS]*
3	**Foundational Skills** *Information Management [IM], Quantitative Lit,/Reasoning [QTR]*
4	**Social Responsibility** *Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]*
5	**Industry, Professional, Discipline Specific Knowledge and Skills**

J. APPLIED LEARNING COMPONENT: **Yes_____ No_____**

If Yes, select one or more of the following categories:

Classroom/Lab___
Internship___
Clinical Practicum___
Practicum___
Service Learning___
Community Service___
Civic Engagement___
Creative Works/Senior Project___
Research___
Entrepreneurship___
(program, class, project)

K. TEXTS:

Marieb, Elaine N and Katja Hoehn, *Anatomy and Physiology*, 4th edition, Benjamin/Cummings Inc., 2011

NOTE – Any edition of *Anatomy and Physiology* by Marieb can be used

Francis C., Taylor J. and R. Tavernier, *Anatomy and Physiology Laboratory Manual*, SUNY Canton, 2012.

HIGHLY Recommended and available at the SUNY Canton Bookstore

Isac, M. James and Eugene Rutheny. *The Home Lab: A Photo Guide for Anatomy Lab Materials, 2003*

L. REFERENCES: NA

M. EQUIPMENT: Cat dissection voucher and gloves, available at SUNY Canton Bookstore. Arrangements to purchase these items will be made towards the middle of the semester.

N. GRADING METHOD:

A 90 and above

B+	85 to 89
B	80 to 84
C+	75 to 79
C	70 to 74
D+	65 to 69
D	60 to 64
F	60 and below

O. SUGGESTED MEASUREMENT CRITERIA/METHODS:

- Term tests
- Lab exams
- Final exam
- Online quizzes

P. **DETAILED COURSE OUTLINE:**

I. Endocrine system
   - A. Hormone type and cell interaction
   - B. Major endocrine organs and their hormones

II. Cardiovascular system
   - A. Macroscopic and microscopic heart anatomy
   - B. Coronary circulation
   - C. Cardiac muscle fibers
   - D. Sequence of excitation
   - E. Mechanical events of heart contraction
   - F. Cardiac output
   - G. Structure of blood vessels
   - H. Arteriole, capillary and venous systems
   - I. Blood pressure and circulation physiology
   - J. Tissue perfusion
   - K. Blood structure and function
   - L. Erythrocyte anatomy and function
   - M. Leukocyte anatomy and function
   - N. Hemostasis
   - O. Transfusion

III. Lymphatic system
   - A. Lymphatic vessel structure
   - B. Lymphatic tissues and organs

IV. Immune system
   - A. Innate defense -surface barriers
   - B. Innate defense – cells and chemicals
   - C. Adaptive defense
   - D. Antigens
   - E. Humoral Immune response
   - F. Cellular Immune response

V. Respiratory system
   - A. Functional anatomy of the respiratory system
   - B. Mechanics of breathing
   - C. Physical rules of gas exchange
   - D. Respiratory transport of gases
   - E. Control of respiration

VI. Digestive system
- A. Digestive processes
- B. Organs of digestion – macroscopic and microscopic
- C. Digestion and absorption of nutrients
- D. Defecation
- E. Nutrition
- F. Metabolism

VII. Urinary system
- A. Kidney anatomy – macroscopic and microscopic
- B. Nephron anatomy and physiology
- C. Urine formation
- D. Micturition
- E. Osmoregulation – cellular and systemic

VIII. Reproductive system
- A. Anatomy of the male and female reproductive systems
- B. Gamete production – physiological processes and hormonal regulation
- C. Sexually transmitted diseases

Q. LABORATORY OUTLINE:

***Note that students must be able to identify all structures without a word bank or similar aid.**

Body Organs and Endocrine System

A. Label and identify endocrine anatomy on the torso models and posters.

B. Identify the microscopic anatomy of the thyroid, adrenal, parathyroid and pituitary glands.

C. Answer questions based on the experiments seen in the endocrine system video.

D. Identify the major body organs listed using the torso models and posters. Be able to answer basic questions about the primary function of the organs.

Endocrine

Anatomy pineal

gland

hypothalamus

pituitary gland

thyroid gland

thymus gland

adrenal glands

pancreas ovary

testis

Body

Organs

heart lungs

stomach

liver

pancreas

gallbladder

spleen small

intestine

large

intestine

kidneys

bladder

ovaries

uterus

testis

Cardiovascular System

A. Label and identify the heart anatomy structures.

B. Define the terms systole, diastole and cardiac cycle. Describe the events of the cardiac cycle using an ECG recording.

C. Relate heart sounds to events in the cardiac cycle and be able to identify the heart sounds on an ECG recording.

D. Define a pulse, pulse deficit, the protocol required for determining a pulse and the calculation for determining a pulse deficit.

E. Be able to explain the protocol for determining blood pressure. Understand and be able to explain the effects of exercise and posture on blood pressure.

F. Understand how skin colour can be used as an indicator of circulatory function, including the influence of chemical and physical factors on skin colour.

G. Be able to identify the deflection waves and relate them to the events of the cardiac cycle on an ECG recording.

H. Be able to calculate heart rate using an ECG recording.

I. Be able to identify heart sounds on an ECG recording.

J. Describe the composition of blood, including the relative proportions of each component. Be able to discuss which conditions may result from an imbalance in leukocyte or erythrocyte numbers.

K. Be able to identify the microscopic structure of erythrocytes, platelets and the **five** types of leukocytes.

L. From a centrifuged hematocrit tube, be able to calculate the percent of each component in the blood.

M. Understand how blood typing is performed. Be able to determine an individual's blood type following a blood-typing experiment. Be able to discuss blood transfusions using the terms agglutination, donor and recipient.

N. Be able to identify arteries and veins microscopically. Further, be able to identify the layers of the vessel walls on a microscope slide. Be able to identify the arteries and veins listed on the objective sheets on the cat, torso, vascular skull, arm and leg models.

Atria: Receiving Chambers

atria atrial septum

auricles pectinate

muscles fossa ovalis

superior vena cava

inferior vena cava

opening for coronary

sinus pulmonary veins

Ventricles: Discharging

Chambers ventricles

interventricular septum trabeculae

carnae pulmonary trunk

pulmonary arteries ascending

aorta

Aorta

ascending

aorta aortic

arch

descending

aorta

brachiocephali

c artery left

common

carotid artery

left subclavian

artery

ligamentum

arteriosum

Valves atrioventricular

valves chordae tendineae

pulmonary semilunar

valve aortic semilunar

valve papillary muscles

Coronary Circulation

coronary arteries circumflex

artery anterior
interventricular artery
marginal artery posterior
interventricular artery great
cardiac vein small cardiac
vein middle cardiac vein
coronary sinus

THORACIC CAVITY

Arteries

ascending aorta aortic arch
descending aorta thoracic aorta*
brachiocephalic artery*
right subclavian artery* left common carotid artery*
right common carotid artery*
left subclavian artery*
external carotid artery
internal carotid artery
vertebral artery

Veins

azygous vein superior vena cava* r&l brachiocephalic veins*
r&l internal jugular veins
r&l external jugular veins*
r&l subclavian veins*

ABDOMINAL CAVITY

Arteries

inferior phrenic artery
celiac trunck
left gastric artery splenic artery hepatic artery
superior mesenteric artery*
renal artery* suprarenal artery* gonadal artery*
inferior mesenteric artery*
abdominal aorta*

Veins

inferior vena cava*
hepatic veins
superior mesenteric vein* inferior mesenteric vein*
hepatic portal vein renal vein* suprarenal vein*
gonadal vein*

BRAIN

Arteries

basilar artery
posterior communicating artery

posterior cerebral artery
middle cerebral artery
anterior cerebral artery
anterior communicating artery

ARMS

Arteries	**Veins**
axillary arterty	axillary vein
brachial artery ulnar	brachial vein
artery radial artery	ulnar vein
deep palmar arch	radial vein median
superficial palmar	cubital vein
arch	cephalic vein
digital artery	basilic vein

LEGS

Arteries	**Veins** common
common iliac	iliac vein* external
artery* external iliac	iliac vein internal
artery internal iliac	iliac vein femoral
artery femoral artery	vein popliteal vein
popliteal artery	anterior tibial vein
anterior tibial artery	posterior tibial vein
posterior tibial	fibular vein great
artery fibular artery	saphenous vein
arcuate artery digital	small saphenous
artery	vein

Lymphatic System

A. Identify the anatomical structures of the lymphatic system

Pharyngeal tonsil (T)
Palatine tonsil
Thymus gland
Spleen
Inguinal lymph nodes
Axillary lymph nodes
Cervical lymph nodes
Lymphatic vessels
Right lymphatic duct
Cisterna chyli
Thoracic duct
Entrance of 2 ducts into the subclavian veins
Appendix

Respiratory System

A. Identify the upper and lower respiratory structures listed on the attached sheet. Note that you will be tested using the models, torso and posters.

B. Define and be able to calculate lung capacities and volumes by using the equations discussed in lab.

C. Based on the tests performed in lab, answer questions about factors that influence respiratory rate.

D. Based on the tests performed in lab, answer questions about the function of buffers and the role of the blood as a buffer

Digestive System

A. Identify the digestive system structures listed on the attached sheets. Note that you will be tested using the mandible model, torso, cat and posters.

B. Identify a slide of small intestine, locating the villi, lumen and muscular layers

Mandible Model

body of mandible
ramus of mandible
angle of mandible
mandibular notch
condyloid process
coronoid process
masseter muscle
temporalis muscle
gingivae
teeth
incisors
canines(cuspids)
premolars(bicuspids)
molars
enamel
dentine
dental pulp
root canal
mandibular foramen
inferior alveolar artery, vein & nerve
mental foramen
mental artery, vein & nerve

Model & Poster

Sagittal Head

oral orifice
oral cavity
oral mucosa
mylohyoid muscle
hyoid bone
tongue
lingual tonsil
hard palate
soft palate
uvula
fauces
palatine tonsil
parotid gland
submaxillary gland(submandibular gland)
sublingual gland
oropharynx
laryngopharynx
esophagus

Small Intestine Model

villus
lacteal
goblet cells
columnar epithelium
intestinal crypts
peyer's patch
lymphocytes
circular muscle layer
longitudinal muscle layer
afferent artery of villus
efferent vein of villus
submucosa
mucosa

Thoracic Cavity esophagus diaphragm muscle
location of esophageal hiatus cardiac sphincter

Stomach

cardia
fundus body
pylorus
pyloric sphincter
rugae
greater curvature
lesser curvature
greater omentum

Small intestine

duodenum
duodenal
papilla ileum
jejunum

Large intestine cecum
ileocecal valve
ascending colon
hepatic flexure
transverse colon
splenic flexure
descending colon
sigmoid colon
rectum
mesentery
appendix

Pancreas

pancreatic duct

Gall bladder

cystic duct
R & L hepatic ducts
common hepatic duct
common bile duct

Liver right lobe
left lobe caudate
lobe quadrate
lobe falciform
ligament

Male & Female Pelvis Models

parietal peritoneum visceral
peritoneum sigmoid colon
rectum anal canal internal anal
sphincter external anal
sphincter anus

Spleen

Urinary System

A. Identify the urinary system structures listed on the attached sheets. Note that you will be tested using the kidney models, renal corpuscle model, renal lobule model and cat.

B. Identify glomeruli on a slide of kidney tissue. Additionally, distinguish between a slide of healthy kidney and kidney infarction.

C. List normal and abnormal urinary components.

D. Use urinary dip sticks to identify abnormal urinary components in unknown samples of urine.

E. Correlate the presence of abnormal urinary components with specific metabolic disease conditions.

Renal Capsule
Renal Hilum
Renal Cortex
Renal Medulla
Renal Pyramid
Renal Papilla
Renal Medulla
Renal Column
Distal Convoluted Tubule
Renal Corpuscle
Proximal Convoluted Tubule
Loop of Henle
Collecting Duct
Renal Pelvis
Major Calyx
Minor Calyx
Ureter
Renal Vein
Interlobar vein
Arcuate Vein
Renal Artery
Interlobar Artery
Arcuate Artery

Reproductive System

A. Identify the reproductive system structures listed on the attached sheets. Note that you will be tested using the pelvis models, torso models and the cat.

B. Identify a slide of testis and ovary. Identify the required cell types on each slide

MALE PELVIS AND TORSO

<u>Scrotum</u>

testis

seminal vesicle

ductus (vas) deferens

ejaculatory duct

spermatic cord

prostate gland

bulbourethral gland

epididymis <u>Penis</u>

bulb of penis prepuce

glans penis corpus

spongiosum corpus

cavernosum
bulbospongiosus
muscle
ischiocavernosus
muscle Urethra
prostatic urethra
membranous urethra
spongy (penile)
urethra urogenital
diaphragm external
urethral sphincter
external urethral
orifice

FEMALE PELVIS AND TORSO

Ovary ovarian ligament
suspensory ligament of
ovary uterine tube
infundibulum of uterine
tube fimbriae Uterus
perimetrium myometrium
endometrium round
ligament uterosacral
ligament Cervix posterior
fornix anterior fornix
Vagina vaginal canal
vaginal orifice urogenital
diaphragm labium majus
labium minus
clitoris
mons pubis

GER 5 Natural Sciences

Outcomes to be Assessed

Students will demonstrate:

1. an understanding of the methods scientists use to explore natural phenomena, including observation, hypothesis development, measurement and data collection, experimentation, evaluation of evidence, and employment of data analysis or mathematical modeling; and

2. application of scientific data, concepts, and models in one of the natural sciences.

Method:

Assessment of Outcome #1 will be accomplished using a course-embedded 10-question instrument to be written by the instructors and submitted for initial approval to the GER 5 coordinator for review by the GER subcommittee of the Academic Assessment Committee.

Assessment of Outcome #2 will be course-embedded and will be based on either exam questions or laboratory assignments written by the instructor which require students to apply scientific data, concepts and models in one of the natural sciences.

The Office of Institutional Effectiveness selects a random 50% sample of GER 5 designated courses to undergo assessment for the fall semester during which GER 5 is up for review (once every three years). Faculty are notified of their course selection during the previous spring semester to allow time for planning assessment activities.

Instructors are responsible for entering their measures into Taskstream by the 4th week of fall semester and entering the findings for these measures into Taskstream by the end of the week following final grade submission. **In addition, instructors must supply at least 3 student artifacts (1 from each level of proficiency: exceeded, met, not met) as samples and attach them in Taskstream. Three artifacts must be provided for both objectives.**

Instructors are responsible for submitting the Data Collection Report (below) to the GER 5 coordinator by the end of the week following final grade submission.

Once all assessment is completed by the GER 5 Coordinator, they must prepare a summary of the results to be given to the General Education Assessment Committee Chair who will forward them to the GER committee for review.

Learning Objectives:	Assessment tools:	Results/Findings:						Reflection/Use of Findings:
Below are the two objectives for GER 5: Natural Sciences. Faculty members are expected to record student proficiency in all areas	This list represents a variety of tools commonly used to assess this SLO. Please select the tool(s) you will be using for the GER assessment. Please highlight the tool(s) you are using, and add a brief description of the tool used (e.g., final exam essay #2) in the space to the right.	Record the number and percentage of students achieving at the different levels for <u>each objective</u> (not each measure.) Percentages will be based on the number of students who participated in the assessment only (e.g., if your course has 10 students enroll, but only 8 take the assessment, those 8 represent the denominator.)						**Based on these results, briefly address what changes you plan for improving student learning.**
Students will demonstrate:	**# of students participating in assessment:**	**Exceeded**		**Met**		**Did not meet**		**<u>Please include planned changes to curriculum, teaching and assessment methods, and/or support services</u>**
		N	**%**	**N**	**%**	**N**	**%**	
1. An understanding of the methods scientists use to explore natural phenomena, including observation, hypothesis development, measurement and data collection, experimentation, evaluation of evidence, and employment of mathematical analysis.	Assignment							
	Exam question(s)	**Description of tool(s):**						
	Oral presentation							
	Project (group or individual)							
	Quiz							
	Research paper							
	Student Artifact							
	Student Portfolio							
	Other (Please specify):							
Students will demonstrate:	**# of students participating in assessment:**	**Exceeded**		**Met**		**Did not meet**		**<u>Please include planned changes to curriculum, teaching and assessment methods, and/or support services</u>**
		N	**%**	**N**	**%**	**N**	**%**	
2. application of scientific data, concepts, and models in one of the natural sciences	Assignment							
	Exam question(s)	**Description of tool(s):**						
	Oral presentation							
	Project (group or individual)							
	Quiz							
	Research Paper							
	Student Artifact							

<table>
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<tr><td>N</td><td>%</td><td>N</td><td>%</td><td>N</td><td>%</td></tr>
<tr><td rowspan="2"></td><td>Student portfolio</td><td colspan="6" rowspan="2"></td><td rowspan="2"></td></tr>
<tr><td>Other (Please specify):</td></tr>
</table>

GER Assessment Policies

Faculty and students will periodically be required to engage in assessment activities to ensure that the General Education learning outcomes are being met.

- GER student learning outcomes are assessed on a three year cycle through the courses designated as meeting that GER.
- Any instructor (full-time or adjunct) teaching any course with a GER designator (online or face-to-face) may be called to participate in GER assessment activities.
- A random sample of GER designated courses are selected by the Office of Institutional Effectiveness during the spring semester preceding the GER assessment year. If a faculty member is teaching two of the same course they have the option of choosing either section for assessment.

- **Timeline for GER Assessment:**
  - February (**Spring Semester**): Office of Institutional Effectiveness (OIE) notifies GER assessment coordinator of upcoming assessment and calls for methodology revisions (if any)
  - March 1: Methodology changes for upcoming assessment cycle must be submitted to GER Assessment Subgroup
  - Mid-April: OIE selects courses up for GER review the following fall and notifies faculty
  - 2nd week of classes (**Fall Semester**): OIE reminds faculty (and notifies new faculty) of GER assessment requirements
  - End of 4th week of classes: Faculty must enter their assessment measures of GER course SLOs into Task Stream.

- End of 5th week of classes: Faculty update GER coordinator on progress with measure entry in Task Stream.
- 1 week after final grade submission: Faculty must enter findings to Taskstream measures and submit Data Collection Reports to GER coordinator along with student artifacts.
- Friday before the first week of classes (**Spring Semester**): faculty will meet to discuss GER findings and strategic plan for improving student learning.
- March 1: GER Summary Report and GER Campus Report due to GER Assessment Subcommittee for review and recommendations.
- March 15: GER Assessment Subcommittee presents reports and recommendations to Academic Assessment Committee
- April 1: Academic Assessment Committee presents reports to Deans' Cabinet for inclusion in budget (if applicable.)

- **Protocol for creating a new course for GER approval:**
  - For a course to be accepted as a GER course, the GER assessment methodology must be attached to the course proposal as it moves forward to curriculum committee. GER mapping to course SLOs must be present in course proposal.
  - Course SLO's need to include the GER SLO's.

- **Protocol for Methodology Revision**
  - Faculty who wish to revise their GER methodology must submit proposed methodology to the GER committee by the fifth week of the semester before their assessment cycle begins.
  - The GER committee will review and provide feedback for revision, and if necessary request a meeting with the GER coordinator. They will provide feedback within six weeks.
  - Resubmission of the revised methodology must occur by the last day of the semester prior to the assessment cycle the methodology will be used in.
  - If the methodology does not comply with the needs of the campus and SUNY standards, the previous methodology will be employed for the assessment cycle.