



## KNES-210 – Functional Anatomy and Physiology 2

Health and Human Services

**Effective Term & Year:** Fall 2023

**Course Outline Review Date:** 2028-03-01

**Program Area:** Health

### Description:

A continuation of KNES 200, this course is designed to allow students to continue to explore the anatomy and physiology of the human body. Special emphasis will be placed on the systems that play a significant role in human movement and physical activity. These include the cardiovascular, respiratory, urinary and digestive systems. The lymphatic, immune, reproductive and integumentary systems will also be examined.

### Program Information:

This is a required course in the Kinesiology Diploma Program and may be used as an elective for students in other disciplines.

**Delivery Methods:** On-campus (Face-to-Face)

**Credit Type:** College of the Rockies Credits

**Credits:** 3

**Course type/s:** Sciences, Lab Sciences

### Instructional Activity and Hours:

Activity	Hours
Classroom, Directed Studies or Online Instruction	45
Seminar/Tutorials	
Laboratory/Studio	45
Practicum/Field Experience	

Co-op/Work Experience	
Other	
Total	90

**Course Requisites:**

- Complete 1 of the following
  - Completed the following:
    - **KNES200** – Functional Anatomy & Physiology 1 (3)
  - Or permission of the instructor.

**Flexible Assessment:** Yes

In some cases students may be able to apply for recognition of prior learning outside the classroom. This flexible assessment process provides equivalent course credit. It is a rigorous process that may include external evaluation, worksite assessment, demonstration, standardized test, self-assessment, interview, products/portfolio, and challenge exam, or other measures as appropriate. Tuition fees apply. Contact an education advisor for more information.

**Course Transfer Credit:**

For information about receiving transfer credit for courses taken at either British Columbia or Alberta institutions, please see <https://www.bctransferguide.ca/> or <https://transferalberta.alberta.ca> . For more transfer credit information, please visit <https://www.cotr.bc.ca/Transfer>

All requests for course transfer credit from institutions in British Columbia or elsewhere should go to the College of the Rockies Enrolment Services office.

**Textbook Resources:**

Textbook selection varies by instructor and may change from year to year. At the Course Outline Effective Date the following textbooks were in use:

OpenStax College, *Anatomy & Physiology, 2nd Ed.* OpenStax College. April 2022. ISBN-13: 978-1-711494-05-0 <https://openstax.org/details/books/anatomy-and-physiology-2e>

KINESIOLOGY 210 Lab Manual Available in the College Bookstore

Marieb, E.N., & Brito, S. (2017). *Anatomy and Physiology Coloring Workbook: A Complete Study Guide* (12th Ed.). Pearson Publishing. ISBN-13: 978-0134459363

*Please see the instructor's syllabus or check COTR's online text calculator*  
<https://textbook.cotr.bc.ca/>  
*for a complete list of the currently required textbooks.*

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## **Learning Outcomes:**

Upon the successful completion of this course, students will be able to

- explain and use anatomical and physiological terminology;
  - demonstrate anatomical and physiological knowledge to the study of human movement;
  - identify the various components of the cardiorespiratory system, including the structures of the heart, lungs and blood vessels;
  - describe the function of the cardiorespiratory system, including respiration, ventilation, circulation, and the cardiac conduction system;
  - identify the various components of the urinary system, including the nephron;
  - describe the role of the urinary system in maintaining fluid, electrolyte and acid-base homeostasis;
  - identify the various structures of the digestive system, and describe its role in nutrient production and metabolism;
  - identify the components of the reproductive, lymphatic and integumentary systems, and describe their basic functions; and
  - explain the relationship that exists between anatomy and physiology and other kinesiology courses.
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## **Course Topics:**

### **Integumentary System**

Histology

Structure and Function of the Skin

- Layers of the Skin
- Accessory Structures
- Vitamin D Production

Role in Physical Activity and Exercise

- Thermoregulation mechanisms

## Cardiovascular System

### A. Size, Location and Orientation

- Coverings
- Heart wall
- Chambers & Associated Vessels
- Pathway of Blood
- Coronary Circulation
- Heart Valves

### Properties of Cardiac Muscle

- Microscopic Anatomy
- Mechanism and Events of Contraction
- Energy Requirements
- Cardiac Physiology
- Electrical Events and the Cardiac Cycle
- Electrocardiography
- Heart Sounds
- Cardiac Output
- Regulation of Stroke Volume
- MVO<sub>2</sub>
- Regulation of Heart Rate

### Response to Physical Activity and Exercise

### Introduction to Cardiac Diseases and Disorders

### B. Blood Vessels

#### Blood Vessel Structure and Function

#### Physiology of Circulation

- Introduction to Blood Flow, Blood Pressure and Resistance
- Systemic Blood Pressure
- Factor Influencing Blood Pressure
- Regulation of Blood Pressure
- Introduction to hydrostatic and colloid osmotic pressures

#### Circulatory Pathways: Blood Vessels of the Body

#### Fetal Circulation

#### Introduction to Vascular Diseases and Disorders

### C. Blood

#### Composition and Functions of Blood

## Cellular Phase

### Erythrocytes

- General Structural and Functional Characteristics
- Production of Erythrocytes
- Regulation of Erythropoiesis
- Fate and Destruction of Erythrocytes
- Leukocytes
- General Structural and Functional Characteristics

### Platelets

### Components of Blood Plasma

### Hemostasis

### Introduction to Blood Diseases and Disorders

## **Respiratory System**

### Structure and Function

- Lungs
- Airways

### Overview of Ventilation

- Ventilatory Muscles
- The Respiratory Reflex
- Pulmonary Function Tests
- Pathway of Air Movement
- Response to Exercise
- Control Mechanisms
- Lung Volumes and capacities

### Overview of Respiration

- Internal
- External
- Spirometry
- Basic Properties of Gases
- Composition of Alveolar Gas
- Control of Respiration
- Oxygen Dissociation Curves

### Integration with Cardiovascular System

- Gas Exchange Between the Blood, Lungs and Tissues
- Transport of Respiratory Gases
- Response to Physical Activity and exercise

Introduction to Respiratory Diseases and Disorders

## **Digestive System**

Functional Anatomy Review

Overview of the Digestive Process

- Physiology of Mechanical/Chemical Digestion and Absorption: Oral Cavity, Esophagus, Stomach and Small Intestine
- Reflexes
- Hormonal Control of Digestion
- Large Intestine Function
- Accessory Digestive Organs and Glands
  - Teeth
  - Liver and Gallbladder
  - Pancreas

Introduction to Digestive System Diseases and Disorders

Basic Metabolism and Nutrients

- Roles in Energy Production for Physical Activity

## **Urinary System**

Introduction to Kidney Function

- Endocrine
- Metabolic
- Excretory
- Regulatory

Functional Anatomy Review

- Review of Cell Physiology
  - Behaviour of Solutions, Suspensions, Colloids
  - Membrane Transport Mechanisms
- The Nephron
- Urine Formation
  - Filtration, Tubular Reabsorption and Tubular Secretion
  - Regulation of Urine Formation

- The Micturition Reflex

The Urinary System's Role in Physical Activity and Exercise

The Urinary System's Role in Maintaining Homeostasis

- Introduction to Fluid and Electrolyte Balance
- Acid-Base Homeostasis

Introduction to Urinary System Diseases and Disorders

## **Reproductive System**

Functional Anatomy Review

- Male and female reproductive systems

Spermatogenesis

- Mechanism and Hormonal Control

Oogenesis

- Mechanisms and Hormonal Control: The Menstrual Cycle
- Molecular Mechanism of Fertilization
- The Female Reproductive System and Physical Activity
  - Dysmenorrhea, Amenorrhea

Introduction to Exercise Physiology and Pregnancy

Introduction to Reproductive System Diseases and Disorders

## **Lymphatic System and Immune System**

Review of Structure and Function of the Lymphatic Circulatory System

- Other Lymphatic Tissues

The Immune System

- Humoral Immunity
- Cellular Immunity
- Introduction to Immune System Diseases and Disorders

## **LAB PROGRAM**

- Lab 1: Histology and Terminology Review, Integumentary System
- Lab 2: The Heart
- Lab 3: The Blood Vessels
- Lab 4: The Respiratory System
- Lab 5: The Cardiorespiratory System and Exercise (ECG, HR, BP, Lung Volumes & Capacities)
- Lab 6: The Digestive System
- Lab 7: The Urinary system
- Lab 8: The Reproductive, Immune and Lymphatic Systems
- Lab 9: The Lymphatic and Immune Systems

See instructor's syllabus for the detailed outline of weekly readings, activities and assignments.

## Evaluation and Assessments

### Assessment Type: On-Campus (face-to-face)

Assessment Type	% of Total Grade
Midterm 1	15%
Midterm 2	15%
Lab Exam 1	15%
Lab Exam 2 (cumulative)	25%
Final Exam (cumulative)	30%
Total	100%

### Grade Scheme

A+	A	A-	B+	B	B-	C+	C	C-	D	F
>=90	89-85	84-80	79-76	75-72	71-68	67-64	63-60	59-55	54-50	<50

**Pass requirements:** None

**Evaluation Notes:** A grade of "D" grants credit, but may not be sufficient as a prerequisite for sequential courses.

### Exam Attendance:

Students must attend all scheduled exams at the appointed time and place. Instructors may approve an alternate exam to accommodate an illness or personal crisis. Department heads will consider other written requests. Any student who misses a scheduled exam without prior approval will receive a "0" on the exam.

### Academic Policies:

College of the Rockies policies related to courses can be found at <https://cotr.bc.ca/about-us/college-policies/> and include the following:

- Policy 2.4.3 Students with Documented Disabilities
  - Policy 2.4.4 Student Conduct (plagiarism, other cheating, behavioral misconduct)
  - Policy 2.5.8 Academic Performance
  - Policy 2.5.3 Grade Appeal
  - Policy 2.4.9 Student Concerns Re Faculty
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### **Equivalent Course(s) and Course Code Changes**

Prior Course Code: HKIN 210 >> KNES 210

Date changed: September 2012

### **Course Changes:**

The College of the Rockies updates course outlines regularly to meet changing educational, employment and marketing needs. The instructor will notify students in writing of any updates to this outline during the semester. The instructor reserves the right to revise, add or delete material while meeting the learning outcomes of this course outline.