



## Functional Anatomy and Physiology 2 – KNES 210

### Kinesiology Program

### Course Outline

COURSE IMPLEMENTATION DATE:	Pre 1998
OUTLINE EFFECTIVE DATE:	September 2023
COURSE OUTLINE REVIEW DATE:	March 2028

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#### GENERAL COURSE 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.

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

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**Delivery:** This course is delivered face to face.

**COTR Credits:** 3

**Hours for this course:** 90 hours

#### Typical Structure of Instructional Hours:

Instructional Activity	Duration
Lecture Hours	45
Seminars / Tutorials	
Laboratory / Studio Hours	45
Practicum / Field Experience Hours	
Other Contact Hours	
<b>Total</b>	90

#### Practicum Hours (if applicable):

Type of Practicum	Duration
On-the-job Experience	N/A
Formal Work Experience	N/A
Other	N/A
<b>Total</b>	

**Course Outline Author or Contact:**

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Signature**APPROVAL SIGNATURES:**

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Department Head Signature\_\_\_\_\_  
Dean Signature

EDCO

Valid from: September 2023 – March 2028

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Education Council Approval Date**COURSE PREREQUISITES AND TRANSFER CREDIT:****Prerequisites:** KNES 200 or permission of the instructor**Corequisites:** None**Flexible Assessment (FA):**

Credit can be awarded for this course through FA

☒ Yes ☐ No

Learners may request formal recognition for flexible assessment at the College of the Rockies through one or more of the following processes: External Evaluation, Worksite Assessment, Demonstration, Standardized Test, Self-assessment, Interview, Products/Portfolio, Challenge Exam. Contact an Education Advisor for more information.

**Transfer Credit:** For transfer information within British Columbia, Alberta and other institutions, please visit <http://www.cotr.bc.ca/Transfer>.

Students should also contact an academic advisor at the institution where they want transfer credit.

**Prior Course Number:** HKIN 210 ⇌ KNES 210**Date changed:** September 2012

## Textbooks and Required 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*, 2<sup>nd</sup> 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* (12<sup>th</sup> 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:

### Histology

Epithelial Tissue

### Integumentary System

#### Histology

Structure and Function of the Skin

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

## Role in Physical Activity and Exercise

- Thermoregulatory 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
- $\text{MVO}_2$
- 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
- Introduction to Laws Governing 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 of Nutrients

- Roles in Energy Production

## **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

- Mechanisms 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 Systems and Exercise (ECG, HR, BP, Lung Volumes & Capacities)

Lab 6: The Digestive System

Lab 7: The Urinary System

Lab 8: The Reproductive System

Lab 9: The Lymphatic and Immune Systems

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

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## EVALUATION AND ASSESSMENT:

Assignments	% Of Total Grade
Midterm 1	15%
Midterm 2	15%
Lab Exam 1	15%
Lab Exam 2 (cumulative)	25%
Final Exam (cumulative)	<u>30%</u>
Total	100%

*Please see the instructor's syllabus for specific classroom policies related to this course, such as details of evaluation, penalties for late assignments, and use of electronic aids.*

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## EXAM POLICY:

Students must attend all required scheduled exams that make up a final grade at the appointed time and place.

Individual instructors may accommodate for illness or personal crisis. Additional accommodation will not be made unless a written request is sent to and approved by the appropriate Department Head prior to the scheduled exam.

Any student who misses a scheduled exam without approval will be given a grade of "0" for the exam.

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**COURSE GRADE:**

Course grades are assigned as follows:

Grade	A+	A	A-	B+	B	B-	C+	C	C-	D	F
Mark (Percent)	≥ 90	89-85	84-80	79-76	75-72	71-68	67-64	63-60	59-55	54-50	< 50

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

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**ACADEMIC POLICIES:**

See [www.cotr.bc.ca/policies](http://www.cotr.bc.ca/policies) for general college policies related to course activities, including grade appeals, cheating and plagiarism.

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**COURSE CHANGES:**

Information contained in course outlines is correct at the time of publication. Content of the courses is revised on an ongoing basis to ensure relevance to changing educational, employment and marketing needs. The instructor will endeavour to provide notice of changes to students as soon as possible. The instructor reserves the right to add or delete material from courses.