



KNES-200 – Functional Anatomy & Physiology 1

Health and Human Services

Effective Term & Year: Fall 2022

Course Outline Review Date: 2025-03-01

Program Area: Health

Description:

This course is an introduction to the structure and function of the systems involved in the control and execution of human movement. Special emphasis will be placed on the musculoskeletal, nervous and endocrine systems that are responsible for the integration and control of human movement.

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:

- Earned a minimum grade of C+ (65%) in at least 1 of the following:
 - **ATPH 12** – Anatomy and Physiology 12
 - **BIOL090** – Biology-Provincial Level (Human Biology) (3)
 - **BIOL101** – Introduction to Biology 1 (3)
 - **BIOL101** – Introduction to Biology 1 (3)
 - **KNES190** – Basic Human Anatomy (3)

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*. OpenStax College. 25 April 2013.
<http://cnx.org/content/col11496/latest/>.

KNES 200 Lab Manual – Available at 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.

Learning Outcomes:

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

- explain and use anatomical and physiological terminology;
 - explain organ system involvement in human structure, sensation and perception, movement, integration, and regulation;
 - identify the various components of the skeletal and articular systems, including joint structures;
 - describe the skeletal system including bone composition, function, remodeling, and growth regulation;
 - identify the main muscles of the human body, their origins, insertions and actions;
 - describe the muscular system, including contraction kinetics, excitation contraction coupling, fibre types, and muscle energetics;
 - identify the structures of the central and peripheral nervous systems;
 - describe the nervous system, including action potentials, impulses, neural processing, structure and function of the central and peripheral nervous systems, and special senses;
 - explain the integration of the skeletal, articular, muscular and nervous systems as it relates to human movement and physical activity;
 - identify the components of the endocrine system; and
 - describe the role the endocrine system plays in control and regulation of the body.
-

Course Topics:

1. ORGANIZATION OF THE BODY

A. Levels of Structural Organization

Maintaining Life

- Homeostasis
- The Language of Anatomy
- Anatomical Position and Directional Terms
- Regional Terms

- Body Planes and Sections
- Body Cavities and Membranes

Structure and Function of Cells

B. Histology

- Basic Characteristics
- Definition
- Epithelial Tissue
- Connective Tissue
- Nervous Tissue
- Muscle Tissue
- Tissue Repair

2. COVERING, SUPPORT & MOVEMENT OF THE BODY

A. Skeletal System

Functions of the Bones

Classification of Bones

Bone Structure

- Gross Anatomy
- Microscopic Structure of Bone
- Bone Markings
- Chemical Composition of Bone
- Bone Development (Osteogenesis)
- Endochondral Ossification
- Intramembranous Ossification
- Physiological Control of Bone Formation/Maintenance
- Bone Homeostasis: Remodeling and Repair
- Bone Remodeling
- Repair of Fractures
- Introduction to Bone and factors affecting function
- Effects of Resistance Training, Diet and Aging on bone

B. Articular System (Joints)

Introduction to Articulations

Structural and Functional Classification of Joints

– Fibrous Joints

– Cartilaginous Joints

– Synovial Joints

- General Structure and Characteristics
- Types of Synovial Joints
- Introduction to Synovial Joint Injuries

Developmental Aspects of Joints

Effects of Physical Activity, Resistance Training and Aging

C. Muscular System

Functions of Muscle Tissue

Muscle Types

Skeletal Muscle

- Gross Anatomy of Skeletal Muscle Tissue
- Microscopic Anatomy of a Skeletal Muscle Fiber
- Contraction of a Skeletal Muscle Fiber
 - The Molecular Basis of Muscle Contraction
 - Regulation of Contraction
 - Force, Velocity and Duration of Muscle Contraction
- Contractions of Skeletal Muscles
 - How Muscles Respond to Stimuli
 - Motor Unit
 - Muscle Twitch/Tension
 - Muscle Tonus
- Types of Skeletal Muscle Fibers
 - Muscle Energetics
 - Muscle Metabolism
 - Energy Storage

Muscle Fatigue

Muscle-joint Lever Actions

Muscular Dystrophy, Atrophy and Hypertrophy

Thermoregulation

- Hypothermia
- Hyperthermia

Smooth Muscle

- Microscopic Structure
- Contraction

Introduction to Muscle and factors affecting function

3. THE ENDOCRINE SYSTEM

Introduction to Endocrine System Function: In-Body Communication

Homeostasis

- Biochemical Nature of Hormones
- Actions of Hormones at a Molecular Level
- Hormonal Feedback Mechanisms

The Pituitary Gland

- Neurohypophyseal hormones: Targets and Actions
- Adenohypophyseal hormones: Targets, Actions and Extended effects

The Endocrine System and Physical Activity

- Role of hormones in physical activity and exercise
- Performance Enhancing Drugs

Introduction to Endocrine System and factors affecting system function

4. THE NERVOUS SYSTEM

Histology

Introduction to Nervous System Function: In-body Communication

- Molecular Basis of the Nerve Impulse Transmission
- Neuron Classification
- Reflexes
- Physical Performance and Movement
 - Integration of the Nervous and Muscular system
 - Saltatory Transmission

Central Nervous System

- Brain and Spinal Cord

Peripheral Nervous System

- Spinal and Cranial Nerves
- Autonomic Nervous System
- Somatic Nervous System

Special Senses

Introduction to Nervous System Diseases and Disorders

- **LAB PROGRAM**
- Lab 1: Histology & Anatomical and Movement Terminology, Body Planes
- Lab 2: The Skull and Muscles of the Neck and Head
- Lab 3: The Bones and Muscles of the Vertebral Column and Thorax
- Lab 4: The Bones and Muscles of the Shoulder and Arm
- Lab 5: The Bones and Muscles of the Pelvis and Hip
- Lab 6: The Bones and Muscles of the Leg
- Lab 7: Articulations (Joints)
- Lab 8: Nervous System-Brain, Cranial, Spinal & Peripheral Nerves
- Lab 9: Ear, Eye & Endocrine Glands

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
-

Equivalent Course(s) and Course Code Changes

Prior Course Code: HKIN 200 >> KNES 200

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.